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The Impact of Movement Integration on Academic Performance, Engagement and Classroom Behavior

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THE IMPACT OF MOVEMENT INTEGRATION ON ACADEMIC PERFORMANCE, ENGAGEMENT AND CLASSROOM BEHAVIOR

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Abstract

The purpose of this paper is to identify how movement affects a student's academics and behavior within the academic setting. Through research, it was identified that the four main types of movement integration are movement breaks, active lessons, physical activity and physical education. The researchers that focused on the effects on academics used classroom based measures (CBMs) and standardized test to measure the impact of movement. The researchers that focused on the effects of behavior used trained observers and standardized concentration test. Overall, the researchers concluded that all forms of movement integration positively impact academics and behavior. Furthermore, the reduced amount of core instructional time to allow for the movement integration does not negatively affect academics.

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CHAPTER I: INTRODUCTION

Growing up I could be found at the rink down the road from my house, on the baseball field across the street, or in the pool in my backyard. Being outside and out of the house was where I spent evenings, weekends and summers. This was the common habit of most kids and teenagers twenty years ago. Today, times have changed. Instead of the rink, the fields or the backyard, kids can be found indoors. Indoors, kids are playing video games, watching Netflix, taking selfies on Snapchat, or posting their latest trip on Instagram. Kids are spending less and less time being physically active. While this change in itself seems drastic, it is only one part of the issue.

Looking back twenty years ago, the average student was in a physical education class one hour per day, plus recess. Today, students in elementary and middle schools typically spend two to three class periods per week in a physical education class. While recess still exists, it is only utilized by the elementary schools and the idea of its importance seems to be diminishing alongside the importance of physical education.

The reason behind this change at school is not the choice of the teachers or students, but the choice of school boards, district administrators and lawmakers as the focus in school has become centered on test scores, both locally and nationally. This came with the legislation known as No Child Left Behind, which was signed into law in 2002. The focus increased for standardized academic achievement test across the U.S. (as cited in Howie & Pate, 2012). After researching the NCLB act, it doesn't appear that the lawmakers were directly attempting to eliminate movement throughout the school day but it was collateral damage when they heightened the focus on standardized test

(as cited in Klein, 2017). It appears administrators viewed physical education as one of the lowest core requirements and decided to lower it even further. This has resulted in some school districts throughout Minnesota lowering physical education graduation requirements to the point of two trimester classes over the course of four years. If this trend continues, students may not be required to take any physical education course in high school to graduate; instead focusing on other core classes and college preparatory programs.

What do these changes ultimately mean? Students are becoming more and more stagnate. Physical activity is reducing at a rapid rate in the school and at home. Some educators might see this as a positive, students remaining still and unchanging in the classroom. As a special education teacher of students with Emotional Behavior Disorders, the idea of students being forced to remain inactive throughout the school day can have major implications on a student's motivation and focus in class. These observations are supported by a variety of educators and researchers who have been analyzing and examining the impact of physical activity and academic success for the past 60+ years. Studies in France, Quebec, and Australia started the trend of researching the impact on physical activity and student success in a variety of forms (as cited in Trudeau & Shephard, 2008).

Focus of Studies

Physical activity studies also vary in their focus on how movement integration impacts the students. Many studies primarily focus on the impact that movement integration had on students' academics because of its ability to be quantified. The

researchers are able to quantify the impact of the movement integration through scores obtained from a classroom based measures and standardized test. Other studies focused on how movement integration impacts a student's behavior. When discussing behavior, researchers often referred to it as on-task, off-task, attention and concentration. This form of research is not as easily quantified. The researchers consider it to be an objective topic but it carries subjectivity due to measuring it through questionnaires and observations. Numerous studies trained a few observers and use them across the entire study to increase consistency and validity. The last grouping of researchers focused on assessing both academics and behavior within the same study.

Understanding the Vocabulary

Movement Integration

In order to understand the research, one will need to understand the vocabulary. Most of the studies use the term movement integration. When they refer to movement integration (MI), they are referring to one of four types of movement that is incorporated into the lesson: active curriculum, movement breaks, physical education and physical activity. This definition was derived from the information gathered from all the sources provided in the reference section.

Active Curriculum and Active Lessons

Active curriculum is the integration of movement into the curriculum. This means that the students are participating in lessons that involve movement; also known as an active class or active lesson. The movement can be tied directly to the lesson. For example, a student is given a math problem of 3 x 2 = ?. The student jumps from

number to symbol to number to symbol, completes a mental calculation as they jump, and finishes on the number six to complete the equation. The other form of active curriculum has no tie between the curriculum and lesson but they are completed at the same time. For example, two students play catch with a tennis ball as they quiz each other about vocabulary (Donnelly et al., 2009; Erwin et al., 2013; Grieco et al., 2009; Mullender-Wijnsma et al., 2015).

Movement Breaks

This form of movement integration involves the student taking scheduled, intentional movement breaks throughout the day without any academics being tied to the activity. These breaks can be implemented in the form of an organized activity, such as running sprints as a class or completing a variety of plyometric as a class. The breaks can also be implemented in the form of an unorganized break that allows a student to wander freely in a supervised space and engage in movement at their own rigor level (Budde et al., 2008; Mahar et al., 2006).

Physical Education

The third form of movement integration is physical education (PE) class. This form of movement is provided based on the combination of district, state, and national standards. Physical education refers to the classes offered by the school that provide a clear curriculum focused on physical fitness and athletic activities. Students need to fulfill this credit as part of graduation standards. Most studies varied the amount per day and week to measure its impact (Sallis et al., 1999; Shepard et al., 1984; Tremarche, Robinson, & Graham, 2001).

Physical Activity

Physical activity (PA) referred to sports, physical fitness and time spent playing outside. This type of activity was measured in the schools through the form of surveys and physical fitness tests completed by professionals on the participants. It is an indirect form of movement integration because it does not take place within the school day but it does take place within the same day and often times at the school because of the athletics provided by the school (Ahamed et al., 2007; Maeda & Randall, 2003).

Core Academics

When referring to core academics, core classes, core requirements or core instruction, the thesis is referring to the courses that are required each year of education within public schools. These core classes are vaguely described as language arts, mathematics, social studies and science. Physical education is similar to the letter "y" when speaking of vowels; it is sometimes a core class (Shepard et al., 1984; Tremarche, Robinson, & Graham, 2001).

Research Question

The typical student spends about 6.5 hours a day in school studying a wide variety of academics. Depending on the daily schedule of the school or district, a student will have between 0-55 minutes of physical activity. The zero minutes of physical activity occurs more often at the middle school and high school level, where the student is on a quarter, trimester, or semester schedule. In these situations, the student only completes one physical education class during a portion of the year. During the other portion of the year, the students stay seated for the majority of their school day,

with the exceptions of walking from class to class, traveling to the cafeteria for a lunch, or the occasional bathroom break. One would assume that the limited movement throughout a day for a student could result in drowsiness, limited engagement and negatively affect academics.

These assumption leads to the guiding question: How does movement integration affect a student's academic performance according to classroom based measures (CBMs) and standardized assessments? Does movement integration decrease negative classroom behaviors, increase engagement and how is it assessed? Which type of movement integration is most effective – one tied directly to the lesson or one with no direct relationship to the lesson?

CHAPTER II: LITERATURE REVIEW

Literature Search Procedures

To find relevant articles for this thesis, the databases within the online Bethel Library were used. The search began with a general article search of the Academic Search Premier and EBSCO Megafile. The search focused on primary source, peer reviewed articles with empirical evidence. Once the topic and subtopics of the thesis were narrowed down, the search moved to the education specific search engine or ERIC. The keywords that were searched were “movement integration,” “movement breaks,” “active lessons,” “physical education,” and “physical activity.” The research was focused on searching between the years of 1990-2018. Most of the articles are from the year 2000 or newer but the research did include a few articles that were older as they contained relevant and useful information. When there was difficulty finding more relevant information on primary sources; peer-reviewed articles with empirical evidence, the search expanded to include the use of general search engines such as Google Scholar. When articles were found on Google Scholar, research was then tracked back through the Bethel Library to request and gain access. Lastly, research was directed at secondary sources to utilize references pages to help identify more primary articles. Again, the sources found from reference pages of secondary sources were tracked back through the Bethel Library to request access. The framework of this chapter is to help identify the origin of the topic, movement integrations (MI) effects on behavior, MI effects on behavior and engagement, and MI effects on academics and behaviors.

Origin of Topic

No matter the form of movement integration or the focus of the study, this topic has been gaining momentum in today's society because of the pressures from standardized testing scores. The No Child Left Behind (NCLB) legislation resulted in a 68% decrease in staff funding for non-core academic areas, which includes physical education (as cited in Howie & Pate, 2012). However, the limited integration of movement into the classroom did not just begin with the NCLB legislation, as this has been a topic since the 1950's. Through all the research on the topic, there were two major studies that started the conversation of movement integration in the education world.

The first major appearance of this topic was introduced in the 1950's in Vanves, France. Only portions of this research have ever been released because it was never published in a peer-reviewed article. However, the results indicated that students' academics improved over the course of a year, even with the students participating in a half day of academics and half day of physical activity (as cited in Trudeau & Shephard, 2008). Even though the original research was inaccessible, it is important to reference the research because it introduced the idea that movement integration and the effects on student academics and behaviors.

The second landmark research on the topic was conducted in the Trois-Rivieres region of Quebec during the 1970's. In this research, the students in Quebec were split into two groups: experimental group receiving five hours a week of physical education and a control group receiving 40 minutes of physical education a week. Again, in this

research, the experimental group displayed more significant improvements in academic performance in core areas than the control group (as cited in Trudeau & Shephard, 2008).

These two studies were the backbone of movement integration research but lacked in the areas of validity and reliability (as cited in Trudeau & Shephard, 2008). The researchers in this field were searching for more reliable sources to support the need to integrate movement into the academic setting, whether it is done through active curriculum, movement breaks, physical education or physical activity. The movement integration field would find the majority of these studies through the 80's, 90's and especially the 2000's with the introduction of the NCLB legislation.

Influence on Academics

There are three types of research that were identified while researching movement integration in the classroom. This first type and most abundant type of research found for this topic focused on the effects that movement integration has on a student's academics. This whole idea of movement integration and its effects in school appeared to lay dormant after the Trois-Rivieres of the 1970s and until the re-emergence of studies in the mid 1980s.

Terrence Dwyer who is a relatively recognizable name in this field of study introduced the first major study in the mid 80s. Together with couple of his colleagues, he embarked on a massive 9,000 student and 109 school study throughout Australia (Dwyer, Sallis, Blizzard, Lazarus, & Dean, 2001). This study focused on using pre-existing information versus implementing movement integration and then measuring academic

impact. The researchers and data collectors measured the students' physical fitness levels through surveys and verified their fitness through quick fitness tests and assessments like sprints and Body Mass Index (BMI). The staff also collected the students' pre-existing academic information based on their performance in school rather than standardized test scores (Dwyer et al., 2001).

According to Dwyer et al. (2001), there was a positive but low correlation between the students' physical activeness, physical fitness and their academic performance. With further interpretation, this means that the more active and more physically fit students are, the more likely they are to perform at a higher academic level. Conversely, the students that are less physically active and less physically fit tend to perform at a lower academic level.

This study was a strong starting point as it had a significant level of participation, but it definitely lacks in the area of actually implementing movement and determining its impact on the students' academics with a control and experimental group. However, in the early 1990's, one of Dwyer's colleagues, Sallis, took the lead on a study with a similar focus in the southern part of California. This study would take the research to the next level by implementing a physical education (PE) component to the research known as the SPARK program or Sports, Play, and Active Recreation for Kids (Sallis et al., 1999).

This SPARK program is a two-year PE program with two components: 15 minutes of health fitness and 15 minutes of skill-fitness activity. This study contained two experimental groups and one control group, and the results of their academic performance was measured through scores on a Metropolitan Achievement Test or the

MAT standardized administered in the state of California. The researchers were able to collect performance scores for the MAT 6 test on the participants, then implement the SPARKS program over the course of two school years and then use their scores from the MAT 7 test to compare performance with the implication that two groups had significantly more physical activity and less academic instruction over the two years in comparison to the control group. The findings indicated that the experimental group made greater gains in four out of the eight statistical comparisons and the control group made greater gains in one out of the eight statistical comparisons (Sallis et al., 1999). The results between the control and experimental group of the other three statistical comparisons were so close that no conclusion could be formulated for them. Ultimately, the overall results indicated that the experimental group outperformed the control group because they outperformed academically in four categories and the control group only outperformed in one category. It is important to note that the experimental group spent more time with physical education instruction and less time spent with core academic instruction (Sallis et al., 1999).

At this point, the studies began to use the language of Sallis et al. (1999): "…health related physical education does not have detrimental effects on students' academic achievement" (Sallis et al., 1999, p. 133-134). In 2007, Ahamed et al. found a similar conclusion with his study known as Action Schools! British Colombia or AS!BC. He determined that there were no negative effects on academic performance even with an increased level of physical activity (PA). However, different from Sallis et al., Ahamed et al. (2007) integrated his movement through classroom physical activity in the form of

movement breaks (MB) and not physical education specifically. The control group was known as usual performing schools (UP) and the experimental group was known as intervention schools (INT). The INT schools took MB in the form of skipping, jump roping, chair aerobics and more. This meant that teachers had to integrate physical activity into lessons or between lessons and the requirement asked for an increase of 15 minutes per day (Ahamed et al., 2007).

This study used a standardized test, Canadian Achievement Test – 3 (CAT – 3), to collect baseline and final results of academic levels. The standardized test kept the assessment consistent as it was grade specific and given at the same time of the year for both baseline and final analysis for each student. Ahamed et al. (2007) also kept track of the amount of time per week that the students were physically active at school and the rigor of that physical activity through a questionnaire. Again, the overall findings indicated that academic differences between the UP and INT schools were significant at the final analysis. In addition, the students in the INT group increased their physical activity about 50 minutes per week. Therefore, the additional 50 minutes of physical activity per week over the experimental group did not negatively affect the academics of the INT group (Ahamed et al., 2007).

Two year later, Donnelly et al. (2009) found similar results as they were trying to address the impact of physical activity and its impact on childhood obesity. The purpose of this study was to assess the Physical Activity Across Curriculum (PAAC) to see if it promoted physical activity in schools while also reducing obesity in school age children.

This study specifically wanted to address gains in BMI, with a secondary outcome academic achievement (Donnelly et al., 2009).

The research participants included a total of 24 schools; 14 schools were used as PAAC schools, while 10 schools were the control schools for data purposes. The 14 PAAC schools were schools where 90 minutes of physical activity would be implemented in academic classes; this was in addition to physical education courses. Reports in this study come from the baseline results and results after three years of implementation. Donnelly et al. looked at students in second and third grade at baseline compared with fourth and fifth grade at the conclusion of the study (Donnelly et al., 2009).

The plan for PAAC was to implement physical activity intermittently during a school day for a total of 90 minutes. The physical activity would range from moderate to vigorous activity implemented in academically focused lessons. The outcome of this was to assess the BMI of students, with daily physical activity and academic achievement as a secondary outcome. The secondary outcomes of the study were assessed specifically by looking at math, reading, and spelling through the Wechsler Individual Achievement Test - second edition (WIAT-II). Charts from the study indicate that the PAAC group made improvement in all three areas with the most significant gains in math and the least significant gains in reading. Controversially, the charts indicate that the control group regressed in reading and spelling but made slight progress in math (Donnelly et al., 2009). Overall, Donnelly et al. (2009) concluded, “Academic achievement was significantly improved with exposure to PAAC. Foremost, this finding affirms that PAAC did not interfere with learning” (Discussion, para. 6).

Even though Donnelly et al. (2009) didn't specifically state the difference in gains for different subject matters, it is interesting to see that physical activity appeared to have a more positive impact on mathematics than language arts. Erwin, Fedewa, and Ahn (2013) found similar results when comparing academic gains between mathematic and reading fluency after short movement integrated lessons. In this study, the participants included 29 third graders from an elementary school in southeast United States. The 29 students are from two different classrooms. Sixteen students are from the intervention classroom that would receive the physical activity and 14 were from a control classroom. This study was taken during a 20-week period.

Donnelly et al. (2009)examined a variety of assessments to measure the success of the intervention. The assessment scores were analyzed three times throughout the year, in addition to the baseline test given during the first week. The assessments were the following: reading and math classroom based measures (CBMs) and standardized tests. More specifically, students' reading was assessed using three passages that were read aloud. Their math skills were assessed with grade level math problems featuring addition, subtraction, and multiplication. The Standardized tests that were used included the Test of Primary Reading Outcomes (T-Pro), Standardized Testing and Reporting (STAR), Accelerated Reading Program, and the Discovery Education Assessment, measuring reading, language and math (Erwin, Fedewa, & Ahn, 2013).

The teacher in the intervention group led physical activity breaks 20 minutes per day. These physical activities were connected to either the math or reading content of the day – active lessons. The teacher in the control classroom received no physical

activity training and led seatwork activities and lecture based teaching (Erwin et al., 2013).

After the implementation and review of the results, the author indicated that the 20-minute increase of active lessons positively impacted math and reading CBMs over the 20-week experiment. Similar to the previous study done by Donnelly et al., the physical activity had a greater positive impact on math scores than language art scores. The increase in physical activity did not negatively affect the CBM scores of students in the intervention groups. The gains on standardized tests were not as visible as the author believed the study was too short to effect long-term measures, such as a standardized test. Overall, it appeared that the results indicated that movement integration in the form of active lessons improved students' academic outcomes (Erwin et al., 2013).

Tremarche, Robinson and Graham (2007), found similar positive results towards academics as a whole but an opposite result in reference to math and language arts. In this study, different from many of the previously reviewed studies but similar to the SPARK program presented by Sallis et al. (1999) they used the increase in physical education class time approach to integrate movement.

In this study, there were 311 fourth grade students from two different schools in Southeastern Massachusetts. Students at School One were provided with 28 hours of physical education per year. Students at School Two were provided with 56 hours of physical education per year. Participants completed a survey about athletic involvement, individual physical activities and tutoring. Lastly, each student completed a

standardized test known as the Massachusetts Comprehensive Assessment System (MCAS) English and Language Arts (ELA) and MCAS Math in April and May of 2001 (Tremarche, Robinson, & Graham, 2001). There was no baseline test for this study. The researchers focused on comparing the MCAS scores in the two subject areas of the control and intervention group on the scores from 2001 only.

The results from this study are that School Two had a median score about five points higher than School One on the ELA test. School Two also had about 18 percent more students in the proficient and advanced level ranges for the ELA test. School Two had a median score about 2.5 points higher than school one on the Math test. School Two also had about 11 percent more students in the proficient and advanced level ranges for the math test. The study concluded that ELA scores for School Two were considered significantly higher than School One but scores for the two schools did not have a large enough difference for School Two scores to be considered a gain. Nevertheless, School Two had the same results in math and outscored in ELA with less core academic instructional time. Therefore, physical education is not detrimental to academic instruction or standardized test scores (Tremarche et al., 2001).

In 2009, Hillman et al. completed the last study of this section that focused on movement integration's effects on academics. This study took a completely different approach than all previous studies presented, as this group of researchers did not use two different groups to assess the topic. Instead they used the same group of students as the control group and the experimental group. This group of students consisted of 20 children between the ages of nine and ten; eight females and twelve males.

The 20 students were split into two groups and academically assessed at a resting and aerobic heart rate. Group One was tested at a resting heart rate on day one and an aerobic heart rate on day two. Group Two was tested at an aerobic heart rate on day one and a resting heart rate on day one. The exercise that was used to introduce the aerobic heart rate was the students walking on a treadmill for 20 minutes (Hillman et al., 2009).

The study used a standardized Wide Range Achievement Test 3 WRAT-3) and a flanker test. The WRAT - 3 standardized test assessed academic achievement in the areas of reading, spelling and arithmetic. The flanker test consisted of five arrows facing in random directions (<<<<<, <<><<, <><><) and the student was asked to press a button to match the direction of the middle arrow. The flanker test included 20 trials to make sure that there was consistency and understanding by the participants. With this test, they tested the student's speed of response and accuracy. This is also explained in the study as a piece of the student's event-related brain potential (ERP) (Hillman et al., 2009).

The results of the study indicate that the aerobic heart rate assessment scores outperformed the resting heart rate scores. The graphical information from the WRAT-3 indicated that the aerobic heart rate scores out performed in all three academic categories but the reading comprehension scores were the only scores significantly different enough to be recognized. The spelling and arithmetic scores were similar and were considered to have no difference between aerobic and resting. The study hypothesized that the greatest difference may have been seen in reading

comprehension because it was the first test administered. They also suggested that if the WRAT-3 was administered closer to the short bout of exercise, they may have witnessed different results in the other two areas (Hillman et al., 2009).

Furthermore, the graphic information for the flanker test was split for the response time and response accuracy. The response time graphs indicated that the resting heart rates outperformed the aerobic heart rates, while the response accuracy was flipped. After further analysis, the study indicated that the difference between the two groups for response time was not significant enough to determine the stronger performer. However, the response accuracy was significant enough to determine that the aerobic group did outperform the resting group (Hillman et al., 2009). “Accordingly, these data indicate that acute exercise might serve as a cost-effective means for improving specific aspects of academic achievement and enhancing cognitive control during pre-adolescent childhood” (Hillman et al., 2009, p. 1050).

The above section provides examples of many forms of movement integration from simple movement breaks, to active lessons to increased physical education time. In addition, it provides examples of assessing academic performance: CBMs, grades, and standardized test. The next section focuses on how different forms of movement integration impact classroom behaviors and engagement.

Influence on Classroom Behaviors and Engagement

The second type of research in the movement integration field is focused on movement's influence on classroom behavior and engagement. The majority of the studies focused on time-on-task (TOT) vs. off-task behavior and engagement, also referred to as attention and concentration. Mullender-Wijnsma et al. (2015) defined time-on-task as any attentive or engaged behavior during a lesson while time-off-task is any that involves lack of engagement in the lesson. One study from this section focused on a slightly different topic by highlighting stress levels and concentration in regard to noise levels or noise increased with off-task behavior. The data for this section was obtained through observation methods with the one study measuring concentration and attention in a similar manner as Hillman et al. (2009) flanker test.

Mahar et al. (2006) introduced the first impactful study that focused on the influence that movement breaks have on behavior. Mahar et al. wanted to determine the impact that Energizers, the title for the study's movement breaks, have on physical activity levels and on-task behavior for elementary children. The participants consisted of all kindergartners through fourth graders in North Carolina – three classes per grade level and 15 classes in total. The large group of 243 students focused on increasing physical activity in the classroom. The study's subgroup of 62 students, 37 third graders and 25 fourth graders, focused on analyzing on-task behavior. The 62 students were divided into two subgroups to vary the length of the intervention.

In the behavior component, each group participated in a 12-week evaluation that was divided into a control portion and an intervention portion. The control portion

continued school as normal; the first four-week for group one and the first eight weeks for group two. In the intervention division, teachers were asked to lead one non-academic 10-minute activity per day for the last eight weeks for group one and the last four weeks for group two. On-task behavior consisted of students following the class rules and acting appropriate for the situations. Off-task behavior was defined as motor off-task, noise off-task, or passive off-task. Trained observers assessed behaviors for the control portion for the first 30 minutes of class as the pre-observation and then the second 30 minutes of a class for the post-observational data. The same observers collected data for the intervention portion during the 30 minutes before the Energizers (pre-observation) and 30 minutes after the Energizers (post-observation) (Mahar et al., 2006).

On-task behavior from the control portion for both group found that the students were on-task for an average of 71.3% of the time during the pre-observation. Then the control portion data showed that both groups were on-task for an average of 68.2% of the time during the post-observation; a 3.1% decrease of on-task behavior. On-task behavior collected for the intervention portion indicated the students were on-task for an average of 70.9% of the time during the pre-observation. Then it indicated that the students were on-task for an average of 79.2% of the time during the post-observation; an 8.3% increase in on-task behavior. Last, Mahar et al. focused on the data of a smaller sample size, 10 students who had the displayed the least on-task behaviors. Their control information stayed fairly consistent from 57.0% of the time to 55.3% of the time or 1.7% decrease. Their intervention information had a significant

change from 46.1% of the time to 66.0% of the time or 19.9% increase in on-task behavior (Mahar et al., 2006).

Mahar et al. (2006) concluded that the intervention of Energizers' activities resulted in improved on-task behavior for the 3rd and 4th grade groups. In addition, the most off-task students were seen to have the greatest positive gains from the program. Overall, physical activity improves on-task behavior, reduces off-task behavior and will likely improve academic performance due to less time managing behaviors (Mahar et al., 2006).

The next study that focused on on-task behavior appeared in 2009 by Grieco, Jowers, and Bartholomew. However, this group took a different approach to influencing on-task behavior or time-on-task (TOT) as they used active lessons. These researchers implemented the Texas-I-CAN (Initiatives for Children's Activity and Nutrition) program to allow for moderate-to-vigorously active lessons in the core academic subject areas. In addition, the researchers measured students' BMI as they believed this was an indicator of students' physical activity levels outside of the school day.

A total of 137 students, all third graders consented to participate in the study. The students in this study were observed on two separate days; an active lesson observation and an inactive lesson observation. If an observational day was missed, the student was removed from the study. Due to absences and other issues, a total of 97 of the 137 were used in collecting data for this study (Grieco et al., 2009).

Greico et al. (2009) described the structure of the study as, "a 2 (before (pre) and after the lesson (post)) x 2 (lesson type: active and control) x 3 BMI category: normal

weight, at risk, and overweight) repeated-measures factorial design" (p. 1922). This means that the study was divided into two observational periods, two different types of lessons, and the students were divided into three different BMI categories. First, the observers were trained before being asked to collect data involving time-on- task (TOT). Then, the teachers were trained in the Texas-I-Can program. The teacher's control lessons were a typical daily lesson. The active lessons included 10-15 minutes of moderate to vigorous activity. Last, the students' height and weight were measured to assess BMI and place them in one of the three categories (Grieco et al., 2009).

There were two observers present for each observational period and they were observing on and off-task behavior. Each observer would monitor a student for about five seconds before moving to the next subject. Observations lasted for 15 minutes before and after the control and active lesson. The TOT was calculated per student by dividing the number of on-task observations by the total number of observations. The time-off-task was calculated using the same formula with the off-task observations (Grieco et al., 2009).

Grieco et al. (2009) found that TOT decreased during a teacher's traditional lesson. Time-on-task increased when the students were instructed through the use of active lessons. Finally, Grieco et al. (2009) made the inference that, "Modifying student behavior through the usage of physically active academic lessons has the potential to greatly enhance learning by both increasing on-task behavior during academic instruction and decreasing behavioral disruptions throughout the school day" (p. 1925).

Mullender-Wijnsma et al. released a similar study in 2015. These researchers examined the influence that a moderate-to-vigorous physically active lesson had on TOT but they used a greater time frame then just the two observational days of the Texas-I-CAN study. The study was a 22-week intervention in the Netherlands at elementary schools and it is referred to as the F & V - Fit and academically proficient at school study (Fit & Vaardig, 2015).

The participants in this study consisted of 81 elementary students from the Northern Netherlands; 20 socially disadvantaged children (SDC) and 61 non-socially disadvantaged children (non-SDC). The group of 81 students was made up of 41 girls and 40 boys in the second and third grade. Subgroup of 67 students, 33 girls and 34 boys, wore heart monitors during the intervention (Mullender-Wijnsma et al., 2015).

Similar to the two previous studies, data was gathered by trained observers. Engagements or time-on-task in academics was measured with three observation moments - start, midway and end. Observations were completed during the three moments of a typical non-movement lesson (control lesson) and an active lesson (intervention lesson). During the intervention lessons, the students stood behind their chair or next to their desk and marched, jogged or hopped in-place while completing an academic task. These lessons would occur three times a week for 10-15 minutes with the focus on mathematics or language (Mullender-Wijnsma et al., 2015).

The study found that there were significantly lower amounts of time-on-task in the SDC group as compared with the non-SDC group during the control lessons. Both groups had a significant increase in time-on-task after the intervention lesson. The heart

monitors measured the vigor of the active lessons but found no correlations between vigor and TOT. Overall, the researchers concluded that the active lessons could increase engagement without losing instructional time (Mullender-Wijnsma et al., 2015).

The next study focused on attention and concentration and used a test similar to the flanker test used in the Hillman et al. (2009) study. In the Budde, Voelcker-Rehage, PietraByk-Kendziorra, Ribeiro, and Tidow study of 2008, the researchers used the d2-test to assess the participant's attention and concentration. The d2-test is a test similar to word search puzzle, compiled with the letter "d" and "p", in which students were asked to match the letter "d" with other letter "ds". In unison with the d2-test, the participants completed short bouts, 10 minutes or less of movement breaks, of normal sports lessons (NSL – control group) or coordinative exercise (CE – experimental group). The coordinative exercises focused on balance, reaction, adjustment and differentiation. This study made the assumption the movement breaks positively affect attention and concentration, so their narrowed their focus on movement breaks into the two categories (NSL vs. CE) to find how to more effectively impact attention and concentration.

This study was held near Humboldt University in Berlin, Germany. Eighty-nine 13-16 year old students were selected from an elite performance school and randomly assigned to a control group and experimental group. The control group consisted of 44 males and 8 females, while the experimental group consisted of 36 males and 11 females. There were no factors that excluded students from this study (Budde et al., 2008).

Both groups completed the d2-test after a regular, non-movement, school lesson, which was identified as the pre-test. Then the groups split into the control group completing a NSL and the experimental group completing a CE lesson; both of moderate intensity for about 10 minutes. The coordinative exercise was split into 5 stations, lasting about 1.75 minutes each. Station 1 - bouncing a volleyball and alternating hands, station 2 - bouncing a volleyball and basketball simultaneously, station 3 - throwing a handball while alternating hands through a hoop, station 4 - playing catch with a partner using a football or handball while alternating hands, and station 5 - bouncing a volleyball with a hand and controlling a soccer ball with your foot. Upon return from the movement break, students from both groups completed the d2-test again (post-test) (Budde et al., 2008).

The results from the data collected indicated that both groups progressed from the pre-test to the post-test. The experimental group (CE) showed a much higher progression in all categories from pre-test to post-test. The CE group had a more significant increase in total number of responses, a positive correlation between number of correct minus incorrect responses, and a decrease in incorrect marked items. In summary, the author suggested that students have increased attention and concentration when given movement breaks during the school day. Furthermore, coordinative exercise, as opposed to normal sports exercise, during the movement breaks will increase attention and concentration in the classroom (Budde et al., 2008).

The last study that focused on movement influence on behavior and engagement took a completely different approach to the topic. This group of

researchers had their participants take movement breaks with the discipline known as yoga. Their concentration was to evaluate the impact that a relaxation activity had on noise levels, stress levels and consequently, concentration levels (Norlander, Moås, & Archer, 2005).

In the Norlander et al. (2005) study, there was a total of 95 middle school participants. The experimental group consisted of 5 classrooms, 84 students, who participated in the relaxation program. There was an additional group, the control group, of 11 students who did not participate in the relaxation program. The relaxation program consisted of three different types of stretch exercises. The program took place over a four-week period and each individual exercise took place twice a day for about five to ten minutes. The first yoga session was during the students' morning break and the second was after lunch. Both of these periods of time are natural transition periods for the students. Each yoga session concluded with a silent sitting portion. A sound level utensil collected random samplings from all groups for three weeks prior and three weeks after the four-week intervention period. Last, students and teachers completed questionnaires about noise levels and stress levels before and after the four-week implementation.

Norlander et al. (2005) found that noise levels measured in decibels reduced significantly with the experimental group after the relaxation program. However, there was no significant reduction in stress level but there was an increase in the students' ability to concentrate after the relaxation program. It is important to note that both stress and concentration levels were measured through subjective questionnaires

completed by the students and teachers before and after the 4-week implementation period.

Throughout this portion of the literature review it is evident that the researchers focused on movement breaks and active lessons to integrate movement into the academic setting. Most studies used structured observations and standardized questionnaires to quantify their data. One study used an attention concentration test and another measured noise levels. Overall, the groups of researchers worked to quantify their data in an objective manner. In the next subsection, the research turns to a study that was able to measure academic performance, classroom behavior and engagement altogether.

Influence on Academics and Behavior

The third subsection focuses on movement integration into the academic setting by measuring its impact on both academics and behavior. There are two relevant studies for this section. The first study focuses on the impact that a five-minute movement break has on mathematics and the overall effect of classroom efficiency due to classroom behaviors. The second study focused on increasing physical education class significantly over multiple years to see the lasting impact on all academic subject areas and behaviors. The subsection is short but important because it is able to tie the two previous subsections together.

The first study involves a small group of participants, 19 second grade students in Hawaii, seven boys and 12 girls. With this small group, the researchers were trying to find the effects that a short movement break had on an assessment. The specifics are

that students would walk or run for about five minutes, moderate-vigorous activity, four days a week before completing a math fluency assessment. In addition, the teachers observed behaviors and their impact on the classes ability to complete lessons and access work time (Maeda & Randall, 2003).

Maeda and Randall (2003) divided the class into two groups based on academic proficiency – a grade level group and a below grade level group. Three versions for each assessment were distributed to reduce testing familiarity. For example, students would complete version one on day one, version two on day two, version three on day three, and start over by completing version one on day four. Each student was given one minute to complete the assessment to measure his or her math fluency. The students completed the assessment on a transparency and the teacher immediately corrected the transparency and recorded the score. The study went on for 61 sessions or for about 15 weeks, with the physical activity and math assessment occurring four times a week.

During the 61 sessions the staff completed three different phases and each phase lasted about two weeks in length. Phase A was known as the baseline where the students completed the assessment without physical activity. In Phase B, the students were introduced to physical activity. The teacher explained that the students spent most of their time walking instead of running. In Phase C, the students were asked to walk briskly for five minutes before completing the assessment. The study varied from each phase and was completed in the following order - A, B, C, A, C, A, C. During the entire study, the teacher collected daily anecdotal notes to track students' behavior. All the

academic data from the study was provided graphically and it measured the median scores of the groups per session (Maeda & Randall, 2003).

The staff found that when Phase A was applied at the beginning, math fluency stayed relatively low. Low math fluency scores indicate that the student is performing at or below grade level. When it was introduced a second time, the math fluency median scores returned to the low levels after four assessment sessions. When Phase A was introduced a third time, math fluency scores returned to a low level immediately. Phase B was introduced only once and showed slightly higher and more consistent scores than Phase A. Phase C was introduced on 3 different occasions and on all occasions the students displayed a high level of math fluency. Improvement of classroom behavior and a decrease in anxiety levels for the whole class was witnessed during Phase B and C from the anecdotal teacher reports during (Maeda & Randall, 2003).

Maeda and Randall (2003) concluded that math fluency improved for both groups in the class of 19. The students were able to answer more questions and had fewer errors during the timed assessments. The movement breaks appeared to have a much greater effect on the below grade level students. The study displayed that movement integration has a positive effect on math fluency but states more generally that movement breaks, which reduce core academic instruction, have no negative effect on academics. “These findings are supported by Sallis et al. (1999), who reported that physical activity had no negative effect on academic achievement” (p. 21). In addition, physical activity positively changes student’s behavior and can allow a teacher to complete more over the course of a class period or week.

The second study is one of the original, landmark studies in the field of research. The general purpose of this research was to examine how physical education impacts students over a long period of time. More specifically, the researchers wanted to know how a significant increase physical education per week affected a student's classroom grades, assessment scores and behavior (Shepard et al., 1984).

With this research, Shepard et al. (1984) was able to acquire 546 students from two different schools in Quebec to participate. Entire classes were divided into separate cohorts. The experimental cohorts received five plus hours of physical education instruction per week with a trained physical education teacher. The control cohort received only the standard 40 minutes per week.

Throughout the six-year study, the instruction in physical education class was varied by year to include basic motor skills, muscular skills, cardiorespiratory skills and sport specific games. The academic side measured grades based on academic report cards with an alphanumerical scale; grades A through F were assigned values 1 through 6. The teacher report cards gave grades for English, French, Mathematics, Natural Science and behavior. In addition, the Québec Ministry of Education provided standardized assessments in the areas of English, French, Mathematics, and intellectual function. The mean score of report cards and specific assessments determined the students' overall score for each academic subject area for a given school year. The scores for behavior for a given year was determined by the mean score of five annual assessments completed by the teacher (Shepard et al., 1984). The study broke the

results into multiple comparison groups but the relevant results focus on the difference between the control group and the experimental group.

According to teacher reports, the additional physical activity had almost no effect on French scores between the control and experimental. Math had a more significant improvement in grades for the experimental groups and both evaluation forms agreed. According to the assessment and in opposition of the teachers scores, scores for English and overall intelligence were worse for the experimental group. The teaching staff also assessed behavior. Teachers found that behavior was impacted by the study, with better behavior from students in the experimental group. Seventy-eight percent of the teacher reported behavior improving with the experimental group and 76% reported positive character out of these students (Shepard et al., 1984).

In summary, this study found that an increase to physical activity in the typical class day, can positively impact students grades and behaviors. Specifically, similar to the result found by Erwin et al. in 2013, an increase in physical activity positively affected math scores of students. French, English, and overall intelligence scores indicated that the increase in physical education instruction did not negatively impact or even change the students' grades because the students' scores negated each other. For example, a student would improve performance on the CBM but underperform on the standardized test or vice versa. Over the course of the six-year study, there appears to be no disadvantage to the curriculum or the learning process, despite the significant decrease in instruction time in the core academics (Shepard et al., 1984).

This subsection was able to find statistical evidence that indicated the impact that movement integration had on academics and behavior. There were only two studies dedicated to finding evidence for both categories and both studies appeared to downplay the results and impact on behavior. Nevertheless, the research from this subsection lead us as readers to conclude that movement integration positively impacts academics and behavior.

CHAPTER III: DISCUSSION AND SUMMARY

Summary of Literature

It is important to note the topic of movement integration into the academic setting can be divided into numerous subcategories. The subcategories that were identified in this paper are movements' impact on academics, movements' impact on behavior and engagement, and its impact on both of the topics together.

Summary of Influence on Academics

The research for the movement integration topic began with movements' impact on academics. Laid out in this format, it is very broad because movement integration can be categorized in a number of formats and academics can be measured in a number of ways. From the information gathered in the category that focused on influence on academics alone, six studies measured academics with the use of standardized tests (Ahamed et al., 2007; Donnelly et at., 2009; Erwin et al., 2013; Hillman et al., 2009; Sallis et al., 1999; Tremarche et al., 2007). Dwyer et al. (2001) was the only study in this subsection that did not use a standardized test but instead, used classroom grades to measure the impact of movement.

The movement type used throughout the seven studies was not as uniform as the academic assessments. Donnelly et at. (2009) and Erwin et al. (2013) used active lessons to increase movement integration but Ahamed et al. (2007) implemented movement breaks in addition to the active lessons. A short two-years later, Hillman et al. (2009) followed in the ground work laid by Ahamed et al. (2007) and used the format of movement breaks to increase the activity of the students within the classroom. Sallis

et al. (1999) and Tremarche et at. (2007) took a different approach by increasing the participant's instructional time in a physical education class. And yet, Dwyer et al. (2001) approached the topic in an even different manner by using pre-existing information about the student such as BMI or activeness outside of school that was self-reported.

Even with the different combinations of assessment and movement types, there was one category of results and two types of conclusions found from the different researchers. All studies in this subsection displayed results that indicated that the increase of movement into the academic setting resulted in improved academic performance. From that point, Dwyer et al. (2001), Erwin et al. (2013) and Hillman et al. (2009) concluded that students' academic performance increases when they are exposed to increased physical activity throughout the course of a school day. In a similar but more passive stance, Ahamed et al. (2007), Donnelly et al. (2009), Sallis et al. (1999), and Tremache et al. (2007) stated that the increase of physical activity results in a decrease in academic instruction but does not negatively affect the students' academic performance. Overall, this group of researchers appeared to conclude that the integration of movement into the classroom positively influences academics.

Summary of Influence on Behavior and Engagement

The next group of researchers focused on movement integration's influence on behavior and engagement. Empirically measuring behavior and engagement is significantly more difficult to measure than academic success because it is difficult to eliminate bias. In this subsection three of the five researchers took the same approach but two of the five took a completely different approach to quantify their data. The

three that took the same approach, Greico et al. (2009), Mahar et al. (2006), and Mullender-Wijnsma et al. (2015) used trained observers to obtain consistent and valid data on the subjects. The fourth study, Budde et al. (2008), used a test titled the d2-test to quantify attention and concentration. The last study, Norlander et al. (2005) used a two-step approach by measuring noise levels and having the participants complete a questionnaire measuring stress and concentration.

The studies were divided in a similar fashion as they integrated movement. Three researchers, Budde et al. (2008), Mahar et al. (2006), and Norlander et al. (2005) integrated movement by breaking up lessons throughout the day with movement breaks. The next two, Greico et al. (2009) and Mullender-Wijnsma et al. (2015), integrated movement directly into the lessons by using active lessons.

Once again, the researchers divided the results and conclusions in a similar manner. Three of the studies found that their students had an increase of time on-task or an increase in positive behavior. From these findings, Greico et al. (2009), Mahar et al. (2006), Mullender-Wijnsma et al. (2015) concluded that the students had an increase of on-task behavior, a decrease of off-task behavior, and did not appear to lose instructional time. The instructional time that was lost to integrate the movement was recouped by spending less time managing off-task behavior (Greico et al., 2009; Mahar et al., 2006; and Mullender-Wijnsma et al., 2015). The other two studies found a similarly positive impact from the movement integration but were focused on attention and concentration. Budde et al. (2008) assumed the movement integration improves attention but went further to conclude that coordinative exercise has a greater impact

on those behaviors than random exercise. Norlander et al. (2005) also found an increase in concentration and engagement, form of attention, when he implemented a form of coordinative exercise, yoga. As a result, this group of researchers appeared to conclude that the integration of movement into the classroom positive influences classroom behaviors.

Summary of Influence on Academics and Behavior

The third group of researchers focused their attention on gaining information on movement's impact on both academics and behavior. Maede and Randall (2003) were able to gain academic data through the use of classroom based measures in the area of math. At the same time, they collected behavioral data through the use of teacher observations. Shepard et al. (1984) took a slightly different approach as they measured their academic influence with classroom grades and standardized test. However, they also used teacher observations to collect behavioral data.

The two studies from this subsection took different approaches for movement integration; one used movement breaks while the other used an increase in physical education. Maede and Randall (2003) simply implemented a short walking movement break right before participants completed a math assessment. Shepard et al. (1984) significantly changed the playing field for his experimental group by increasing their physical education time by five hours, in addition to the standard 40 minutes.

As in the previous subsections, the researchers in this subsection had similar results and conclusions. Maede and Randall (2003) found higher math scores, lower anxiety and increase in positive classroom behavior. Shepard et al. (1984) found varied

results with academics but improved classroom behavior with the subjects. In summary, the researchers concluded that the increase in movement integration does not negatively affect academics and positive impacts behavior.

Limitations of the Research

The original parameters of the research for this topic have evolved from broad to narrow and back to a broader view. As the research began, the topic started with movement's impact on academics. It was quickly identified that this language was too broad to identify relevant articles. In fact, it was so broad that most searches produced a limited number of primary articles and a large number of secondary sources.

After a short period of time was spent reading through the sources found under the original search, it was apparent that the language for movement and academics needed to be more clearly defined. Instead of movement, I began using movement integration, movement breaks, physical activity, active lesson and physical education. And instead of academics, I began using classroom based measures, classroom grades, assessments, and standardized test. The results had significantly increased the number of primary sources but I felt as the topic was incomplete without including classroom behaviors or engagement.

The next step was to search for primary sources that include movement's influence of classroom behaviors or engagement. Again, I found the same issue with lack of sources due to broad language. At this point, I began using the more specific language for movement and added things for behavior, such as on-task, off-task, attention, and concentration. The articles that were appearing were all on topic, so it took some time

to sift through and gather the appropriate articles. Through both search processes, I was able to identify two valid sources that included information on both topics.

Finally, I took two final steps to identify any additional articles that related to the topic. First, I broadened my research back by utilizing Google Scholar to help identify some additional primary sources on the topic. The idea was to identify sources that Academic Search Premier, EBSCO Megafile, and ERIC left out. It was clear in the early stages of this last attempt that the majority of the primary sources had been acquired. Second, I tracked down numerous secondary sources and cross-referenced their reference page with mine to identify similarities and differences. When differences were found or a quote jumped out of the text at me, I would use all previously identified search methods to track down the articles. These last two steps taken helped identify about five additional articles on the topic.

Due to some of the limitations in the research, I was unable to specifically state which type of movement integration is most effective. In addition, I was unable to specifically state which type of academic assessment or behavioral assessment most effectively identifies the students' progress. Instead, the research is limited to make inferences in those areas and make the generic conclusion that movement integration in the classroom plays a positive role on academics and behavior or at the very least, does not negatively impact the two areas of influence even with the lost core instructional time.

Implications for Future Research

The research has done a decent job of proving that movement integration plays a positive role on academics and behavior in the academic setting. At the very least, it has proven that it does not negatively impact these two areas, even with the loss of core instructional class time. With this base knowledge, the first thing researchers should focus on is drawing connections between the different types of movement integration to the different types of academic progress. For example, do movement breaks make a greater impact on classroom based measures than they do on standardized test? On the contrary, does a significant change in movement throughout the course of a day, like an increase in minutes for physical education class, make a greater impact on standardized test then they do on classroom based measures?

Second, how do the different types of movement integration impact classroom behaviors? Does a movement break or an active lesson reduce off-task behavior in a more significant way than an isolated increase in physical education time? Or does an increase in physical education play a greater role on behavior? I think the direct correlation between movement and behaviors will allow teachers to implement with more success.

Third, what is the relationship between length of time that a movement integration program is implemented and its impact on academics or behavior? Do short term movement programs work better with movement breaks and active lessons? And do these short term programs make a greater impact of classroom based measures and classroom behaviors? On the contrary, do long term movement programs, such as an

increase in physical education, impact standardized test scores more significantly and play a less significant role on behavior. I think it is fair to conclude that all these questions are assumptions that I have developed throughout the thesis writing process, but there is not enough empirical evidence due to a lack of specific primary sources on the topic in the specific areas.

Implications for Professional Application

I believe the research in this thesis paper offers educators and myself a few items to work with moving forward. As educators, it is important to be willing to sacrifice core instructional time to focus on the things that we can control, and to be open to new ideas of instructional practices. If we are unable to do these things throughout our career as an educator, we are destined to become stale and unsatisfied with our profession.

As an educator, especially during our early years in the profession, we believe that we need to fill every minute of a class period with instruction time or student practice time. This in-class time has become increasingly more important as the demands for college and life success have become more dependent on school success. Due to these demands, teachers are reluctant to give up instructional time to take a ten-minute movement break, extend the length of a lesson to add activity, or reduce core class times to extend the length of physical activity or physical education class. If they do give up this time, they believe they are giving up learning opportunities for their students. In reality, numerous studies have shown that movement breaks, active lessons, and additional physical education time does not negatively affect academics or

behavior. In fact, in most cases the students' academics and behavior improves. Therefore, educators need to be willing to sacrifice instructional time throughout the academic day to allow their students to be active (Ahamed et al., 2007; Donnelly et al., 2009; Mullender-Wijnsma et al., 2015; Sallis et al., 1999; Tremarche, et al., 2001).

Next, educators need to follow a common fishing quote, "Mind your own bobber!" In this instance, this means we need to be concerned about our own classroom and students. We are always so concerned about things that are out of our control or about what everyone else is doing in their classrooms. As a teacher, we cannot dictate how much time is set aside for movement in our colleagues' classrooms, physical education class, or recess. However, we can dictate how active students are within our own classroom. Therefore, if we want to improve a student's ability to move around in class, start implementing movement breaks and active lessons (Donnelly et al., 2009; Erwin et al., 2013; Grieco et al., 2009; Mullender-Wijnsma et al., 2015)..

Finally, teachers need to keep an open mind to new instructional practices throughout their career. We all know that the beginning of each year is full of new initiatives from the administrative and district personnel. These new initiatives seem to vanish as quickly as they appear. In addition, they seem as if they come from people that have little to no classroom experience. As a result, the teaching staff shuts out these initiatives before even exploring the information. This situation has happened in the two districts that I have been a part of and the initiative was the same in both districts. It was an initiative to become culturally responsive but at the core of the initiative was to get students moving throughout the class period. Teachers in both

districts dismissed the initiative and never saw the core of the initiative. This viscous circle had led to close mindedness of the teaching body and stagnate teaching practices. If we want to feel satisfied in our profession, we need to continue to grow as educators and the best way in today's society is to implement movement in the form of movement breaks and active lessons. Many of the articles referenced in this paper used movement integration programs: AS!BC, PAAC, Sparks, Texas-I-CAN (Ahamed et al., 2007; Donnelly et al., 2009; Mullender-Wijnsma et al., 2015; Sallis et al., 1999).

The importance of movement integration into the instructional process is not a new concept, but it appears that our society is moving in the opposite direction. However, if teachers are willing to adopt short movement break or incorporate active lessons throughout the day, we will be able to witness the effects. The fascinating thing about this topic is that a movement break involves no additional planning but does require an instructor to give up some control to the students. Overall, remaining open-minded to the movement ideas could produce positive academic and behavioral results.

Conclusion

Movement integration in the academic setting repeatedly demonstrated that it positively impacted academic performance. However, Dwyer et al., 2001; Erwin et al., 2013; Hillman et al., 2009; Shepard et al., 1984; and Tremarche et al., 2007 all had portions of their academic assessment, that had low academic gains over the control group. This means that students were either maintaining or making slight gains with less core instructional time than the core group. Deductive reasoning leads one to believe

that since it did not negatively affect academics, even with less instructional time, then it had a positive influence.

In a more direct evaluative manner, movement integration positively effects classroom behaviors. It increases on-task behavior, attention and concentration while reducing off-task behavior classroom behavior. This topic is not as easily quantifiable but the studies that had the most success collecting the data used consistent trained observers throughout the process.

It is difficult to determine which movement integration form is the most effective with the students. However, I believe that it is easier to categorize them and allow a teacher to decide the effectiveness based on their instructional style. Movement breaks can be used on a daily or hourly basis, involve almost no preparation, but require a teacher to give up control. Physical activity is an extended movement break that typically takes place in an alternative location besides the classroom. It is the bridge between movement break and physical education; ten to twenty minutes in length. Active lessons are typically used on a weekly or bi-weekly basis, involve a significant amount of preparation, but allow teachers to maintain almost complete control. Physical education is not dictated by the teaching staff at all but is effective. Again, the most effective type will be determined by the teacher.

To conclude, all forms of movement integration are an effective way to incorporate physical activity into the academic setting. All forms of movement integration positively affect academics and behavior or at the very least, do not take away from those areas due to lost instructional time. It is up the educator to find the

right combination of movement and instruction to have their students' progress academically and behaviorally.

References

Ahamed, Y., Macdonald, H., Reed, K., Naylor, P., Liu-Ambrose, T., & Mckay, H. (2007). School-Based Physical Activity Does Not Compromise Childrens Academic Performance. *Medicine & Science in Sports & Exercise, 39*(2), 371-376. doi:10.1249/01.mss.0000241654.45500.8e

Bailey, C. G., & DiPerna, J. C. (2015). Effects of classroom-based energizers on primary grade students' physical activity levels. *Physical Educator, 72*(3), 480-495.

Budde, H., Voelcker-Rehage, C., Pietraßyk-Kendziorra, S., Ribeiro, P., & Tidow, G. (2008). *Acute coordinative exercise improves attentional performance in adolescents* doi://doi.org/10.1016/j.neulet.2008.06.024

Donnelly, J. E., Greene, J. L., Gibson, C. A., Smith B. K., Washburn, R.A., Sullivan, D.K., Williams, S.L., (2009). *Physical activity across the curriculum (PAAC): A randomized controlled trial to promote physical activity and diminish overweight and obesity in elementary school children* doi://doi.org/10.1016/j.ypmed.2009.07.022

Dwyer, T., Sallis, J. F., Blizzard, L., Lazarus, R., & Dean, K. (2001). Relation of Academic Performance to Physical Activity and Fitness in Children. *Pediatric Exercise Science, 13*(3), 225-237. Retrieved July 3, 2017, from https://doi.org/10.1123/pes.13.3.225.

Erwin, H., Fedewa, A., & Ahn, S. (2013). Student Academic Performance Outcomes of a Classroom Physical Activity Intervention: A Pilot Study. *International Electronic Journal of Elementary Education, 5*(2), 109-124. Retrieved July 19, 2017, Retrieved from https://search.proquest.com/openview/cd9ac0c7cf04a80bd448df28466dae2e/1?pq-origsite=gscholar&cbl=656305.

Grieco, L. A., Jowers, E. M., & Bartholomew, J. B. (2009). Physically active academic lessons and time on task: The moderating effect of body mass index. *Medicine & Science in Sports & Exercise, 41*(10), 1921-1926. doi:10.1249/MSS.0b013e3181a61495

Grissom, J. (2005). PHYSICAL FITNESS AND ACADEMIC ACHIEVEMENT (T. Boone & R. Robergs, Eds.). *Journal of Exercise Physiologyonline (JEPonline),8*(1), 11-25. Retrieved June 19, 2017, Retrieved from https://www.nemours.org/content/dam/nemours/www/filebox/service/preventive/nhps/pep/physfitacadach.pdf.

Hillman, C. H., Pontifex, M. B., Raine, L. B., Castelli, D. M., Hall, E. E., & Kramer, A. F. (2009). *The effect of acute treadmill walking on cognitive control and academic achievement in preadolescent children.* doi://doi.org/10.1016/j.neuroscience.2009.01.057

Howie, E. K., & Pate, R. R. (2012). *Physical activity and academic achievement in children: A historical perspective* doi://doi.org/10.1016/j.jshs.2012.09.003

Klein, A. (2017, April 10). No Child Left Behind Overview: Definitions, Requirements, Criticisms, and More. Retrieved March 08, 2018, from https://www.edweek.org/ew/section/multimedia/no-child-left-behind-overview-definition-summary.html

Maeda, J. K., & Randall, L. M. (2003). Can academic success come from five minutes of physical activity?*Brock Education, 13*(1), 14. Retrieved from https://search.proquest.com/docview/227241651

Mahar, M. T., Murphy, S. K., Rowe, D. A., Golden, J., Shields, A. T., & Raedeke, T. D. (2006). Effects of a Classroom-Based Program on Physical Activity and On-Task Behavior.

Medicine & Science in Sports & Exercise, 38(12), 2086-2094. doi:10.1249/01.mss.0000235359.16685.a3

Mullender-Wijnsma, M., Hartman, E., de Greeff, J. W., Bosker, R. J., Doolaard, S., & Visscher, C. (2015). Moderate-to-vigorous physically active academic lessons and academic engagement in children with and without a social disadvantage: A within subject experimental design. *BMC Public Health, 15*(1), 1-9. doi:10.1186/s12889-015-1745-y

Norlander, T., Moås, L., & Archer, T. (2005). Noise and Stress in Primary and Secondary School Children: Noise Reduction and Increased Concentration Ability Through a Short but Regular Exercise and Relaxation Program. *School Effectiveness and School Improvement, 16*(1), 91-99. doi:10.1080/092434505000114173

Sallis, J. F., McKenzie, T. L., Kolody, B., Lewis, M., & et al. (1999). Effects of health-related physical education on academic achievement: Project SPARK. *Research Quarterly for Exercise and Sport, 70*(2), 127-34.

Shephard, R. J., Volle, M., Lavallée, H., LaBarre, R., Jéquier, J. C., & Rajic, M. (1984, January 01). Required Physical Activity and Academic Grades: A Controlled Study. Retrieved February 12, 2018, from https://link.springer.com/chapter/10.1007/978-3-642-69465-3_8

Tremarche, P. V., Robinson, E. M., & Graham, L. B. (2007). Physical Education and its Effect on Elementary Testing Results. *Physical Educator, 64*(2), 58-64. Retrieved July 18, 2017, from https://search.proquest.com/openview/e5d4c437f0d41d2f67b0406274891b11/1?pq-origsite=gscholar&cbl=35035.

Trudeau, F., & Shephard, R. J. (2008, February 25). Physical education, school physical activity, school sports and academic performance. Retrieved June 17, 2017, from https://ijbnpa.biomedcentral.com/articles/10.1186/1479-5868-5-10 https://search.proquest.com/openview/9836be66d20ac2cfd990b98785f68006/1?pq-origsite=gscholar&cbl=40785.