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Incorporating Student Physical Movement in the Elementary School Setting

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Incorporating Student Physical Movement
in the Elementary School Setting
by
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Master's Project
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Abstract

With the increase in academic demands on elementary students, students are lacking opportunities for physical movement within the classroom which is adversely impacting student achievement. Research was conducted in order to determine the importance of physical movement for children and possible correlations between student physical movement and academic achievement. Jensen (2005) concluded that physical movement is an integral component in brain development for children that supports engagement and focus which positively impacts academic achievement. Rosenstreich et al. (2022), Wiebelhaus & Hanson (2016), and Reed et al. (2011) found positive correlations between groups of elementary-age students, who were provided frequent opportunities of physical movement during the school day, and an increase in student academic achievement. As a result of these findings, professional development slides were created to educate teachers and administrators around the importance of integrating student physical movement into the classroom setting and provide them with strategies and examples for how to integrate and increase student movement which will help increase student academic achievement.

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Chapter One: Introduction

Problem Statement

With the increase in academic demands on elementary students, students are lacking opportunities for physical movement within the classroom which is adversely impacting student academic achievement. With students spending approximately 80% or more of their school day sitting in their classrooms, students are not being provided consistent physical movement to support student achievement (Gabbard & Barton, 1999). As a result of an increase in academic requirements, the amount of physical movement offered in schools in the United States has declined over the past several years (Kohl & Cook, 2013; Turner et al., 2010). The increase in academic requirements started with the implementation of the No Child Left Behind Act of 2002 which emphasized an increase in academic rigor and accountability on schools for achieving annual academic goals (The Understood Team, 2018). As a result, school administrators have had to begin reducing time from student physical movement activities (e.g., recess, physical education) in order to meet the increase in academic requirements in Mathematics, Reading, Writing, Science, and Social Studies.

Importance and Rationale of the Project

Research has found that physical movement is an important aspect for student developmental and brain growth (Jensen, 2005). Physical movement provides the brain with oxygen which establishes neuron connects that support engagement and

focus (Jensen, 2005). With opportunities for physical movement decreasing during the school days, students are sitting in their seats more each day and expected to engage in increasing academic requirements. As a result, it is highly important that schools and districts establish expectations for involving opportunities for physical movement during the school day and/or simultaneously with academic instruction.

Due to Federal laws around academic expectations (No Child Left Behind Act of 2002, Every Student Succeeds Act of 2015), all 50 states have had to begin adopting more rigorous academic standards and setting annual student achievement goals for all public schools. Despite these requirements, there is no language around requirements of daily physical movement. The United States Department of Health and Human Services (2008) suggested national physical movement guidelines that should include a minimal threshold of 60 minutes of moderate to vigorous movement provided daily to children and adolescents. With no national requirements for student physical movement, each state can provide different thresholds on what physical movement should be provided as well as the number of minutes. This is a big concern nationally and locally for students due to the inconsistency determined by each state.

There have been several studies that have determined a positive correlation between student physical movement and student achievement. Rosenstreich et al. (2022) and Wiebelhaus & Hanson (2016) both found that when kindergarten-age students were provided with opportunities for classroom-based physical movement during the school day, the students then performed better on achievement testing. Both sources also provided different groupings of students to determine the impact of

providing classroom-based physical movement for only one of the groups. Reed et al. (2010) completed a study on the effects of implementing opportunities for physical movement amongst third-grade students. The group of third-grade students were split into an experimental group (physical movement incorporated into school day) and control group (traditional school day). The experimental group performed on an intelligence test and the state mandated achievement test. As a result, Reed et al. (2010) concluded that physical movement can influence academic achievement of elementary-age children.

Background of the Project

There has been history dating back five centuries providing positive correlations between student physical movement and student achievement. The first source of research was from Ismail (1967) who concluded that any type of physical movement incorporated into a school day is beneficial for students and correlates with student achievement. There has been continued research regarding the correlation with more specifics on purposeful student physical movement and how it can be incorporated into a classroom and into a daily lesson (Keays & Allison, 1995; Shephard, 1997; Reed et al., 2010, Wiebelhaus & Hanson, 2016; Rosenstreich et al., 2022).

There has also been history related to the increase in academic demands placed on elementary teachers. The No Child Left Behind Act of 2002 and the Every Student Succeeds Act of 2015 both have provided increased academic expectations and rigor placed on school administration and teachers to meet the increase standards

set Federally. As a result, school administrators have had to accommodate time reserved for student physical movement (e.g., recess and physical education classes) in order to increase time spent on academic curriculum and preparing for state academic achievement tests.

There have been many agencies, foundations, and educational services that have provided recommendations for student physical movement and its relationship to student achievement. The Robert Wood Johnson Foundation's (2009) concluded that academic success does not improve when physical movement/education is removed from the curriculum. The World Health Organization (WHO) recommends that children received 60 minutes of moderate to vigorous physical movement daily (World Health Organization, 2010). National physical movement guidelines suggest that students participate in a minimum threshold of 60 minutes of moderate to vigorous movement be provided daily to children and adolescents (U.S. Department of Health and Human Services, 2008).

With a decrease in amount of time for students to be physically active during the school day, students are sitting for longer durations at a time and as a result are not focusing and engaging in the lessons being taught. This significantly impacts the student's ability to complete the work and achieve academically on assessments.

Statement of Purpose

Reilly et al. (2012) states that many teachers are unaware of what research says about importance of movement for learning and how to adapt activities for any grade level in order to aid teachers in supporting student academic achievement. Webster et al. (2017) suggested that teachers receive training for incorporating strategies for creating developmentally appropriate, movement-integrated lessons, and refocusing students after physical movement activities. Based on these research recommendations, the purpose of this project is to create a presentation for professional development around providing elementary teachers with research, strategies, and examples for incorporating physical movement into academics during the school day. By providing elementary teachers with the research, resources, and examples, the hope is to provide students with more opportunities for physical movement which will improve student academic achievement.

Objectives of the Project

In order to achieve the purpose of this thesis project, research will be reviewed and summarized on the importance and correlation between student physical movement and academic achievement. The objectives will include:

1. Develop a deeper understanding around the research around the importance of physical movement for children and adolescents.
2. Understand how recent federal legislation impacting physical movement in the school setting

3. Recognize the positive correlation between:
 - a. Student physical movement and student academic achievement through research studies.
 - b. Flexible furniture and seating and student academic achievement through research studies.
4. Provide strategies and examples for:
 - a. increased student movement which can help to increase student academic achievement.
 - b. Incorporating flexible furniture and seating into a classroom setting which can help to increase student academic achievement.

Definition of Key Terms

Physical Movement – Physical activities that allow students of all sizes and abilities to engage in enjoyable movement, to the degree that they choose (Rice, 1995)

Academic Achievement – any identifiable success in the areas of scholarship or disciplined study (American Psychological Association, 2022)

Positive Correlation -- a relationship between two variables in which both variables move in the same direction (Mcleod, 2020)

Flexible Furniture and Seating – Work surfaces and seating that provide and support student choice of seating, location, and comfort (Attai et al., 2020)

Scope of the Project

The intended audience for this thesis project is elementary classroom teachers (preschool thru fifth grade). Elementary students reside in the same classroom for a majority of their school day which makes classroom setting an idyllic setting for incorporating physical movement. The responsibility for incorporating physical movement into the classroom setting falls on school administration and classroom teachers. The presentation will provide the who (children), they why (history and positive correlations), the what (examples of physical movement in classroom), and the when (during the school day, during academic lessons) to classroom teachers around incorporating physical movement and how student achievement can be positively impacted.

A hinderance that may affect the implementation of this project would be school administration and classroom teachers not recognizing the importance of incorporating or increasing student physical movement in the classroom. With the increased academic expectations placed on schools to achieve at high academic levels, school administrators and classroom teachers may see incorporating physical movement as taking time away from classroom instruction and learning. Research has shown that physical movement and learning can be done simultaneously and can lead to improvement in academic achievement.

Training and time would also be an hinderance for a classroom teacher. Teachers would need to professional development training in order to develop movement activities, teach the expectations for participating in movement activity

while engaging in an academic activity, and monitor the students to determine effectiveness. With a few teachers already incorporating physical movement activities in their classrooms, it will be crucial for these teachers to mentor and share ideas on developing, implementing, and monitoring the physical movement activities. This presentation will also provide teacher training and research-based examples of flexible furniture, seating, and physical movement activities that can be incorporated into an elementary classroom.

The final hinderance would be around money. Incorporating flexible furniture and seating would require purchasing of some new items (chairs, stools, tables, desks) for a classroom. Classroom teachers may have students rotate between usage of traditional furniture and flexible furniture in order to reduce costs. Classroom teachers would need to use yearly funding provided to each classroom teacher (if applicable) and could also reach out to the school's parent-teacher organization team for possible funding (if applicable).

Chapter Two: Literature Review

Introduction

Academic achievement is positively linked with physical movement in children, with research dating back five decades (Ismail, 1967) along with an increase of studies since (Keays & Allison, 1995; Shephard, 1997; Rosenstreich et al., 2022). Despite an abundance of studies resulting in the positive correlation, students are still sitting in their classrooms for 80% or more of their school day (Gabbard & Barton, 1999) and the amount of physical movement offered in United States schools has declined over the past several years as a result of a push to meet academic requirements (Kohl & Cook, 2013; Turner et al., 2010). To support these positive correlations, the rationale behind student physical movement, and how to incorporate student physical movement into the classroom setting, this project will focus on the following: historical research, federal legislation around the positive correlation, and the increase in academic expectations placed on school administrators and teachers. The focus of the literature review then shifts to identifying recent studies that provide correlations between student physical movement and student academic achievement before reviewing the effectiveness and types of student physical movement that have been used in classroom settings. The chapter concludes with a summary of the main points through the literature review and a synthesis of literature.

Theory/Rationale

Physical movement has been determined to be an important aspect in brain development for children of all ages. Movement provides the brain with oxygen, which is needed to create and feed connections between neurons (Jensen, 2005). These connections are important for children because the part of the brain used during movement activities is used during learning (Jensen, 2005). When the neurons are active, the students are more likely to be engaged and focused during a classroom lesson or activity. Research has shown that students who are engaged and sustaining focus during a lesson are more likely to increase achievement scores (Meade et al., 2016).

Research/Evaluation

Historical Research and Legislation

There have been and continue to be barriers for school administrators and teachers to incorporate student physical movement into the classroom setting during the school day. Creating a plan to achieve these barriers will need to be individualized by classrooms and schools as there are minimal requirements around the amount of physical education needed per week in addition to the amount of recess needed daily. Currently, the State of Michigan mandates that elementary schools provide their students with physical education but it does not specify certain minutes per week and does not require daily recess in elementary schools (Teachout, 2016). National physical movement guidelines suggest that a minimal threshold of 60 minutes of

moderate to vigorous movement should be provided daily to children and adolescents (U.S. Department of Health and Human Services, 2008). Due the inconsistencies in mandates and guidelines for student physical movement in elementary schools, this can create inconsistencies amongst elementary schools across the nation. The implementation of student physical movement is placed upon school administration and classroom teachers at a local level.

Another barrier to student physical movement into the classroom is the increased academic demand and expectation placed on teachers as a result of the No Child Left Behind Act of 2002. Prior to No Child Left Behind, Castelli et al. (2014) provided a historical review of physical movement and academic performance research focused on children and adolescents. The research around physical movement and academic achievement has a correlation history dating back to 1967 when a researcher began studying the relationship between physical movement and academic achievement in children and concluded a positive correlation between the two (Ismail, 1967). The next research findings around the positive correlations occurred in 1995 when Keays and Allison (1995) researched around the effects of physical movement on student outcomes. Prior studies were based around male and female participation in physical education classes and how the participation affected their achievement in the classroom (Castelli et al, 2014). Keays and Allison's (1995) review provided a recommendation that schools increase the intensity of physical movement within the physical education classes as they found it to provide benefits

associated with: overall health, academic performance, attitudes and classroom behavior.

Momentum continued to build with the research around the positive correlation and the increase in physical movement in the school setting. In 1997, Shephard conducted a research review and identified the need for more curriculum time in physical education and recommended federal policy modification to support these changes. He also recommended a shift from a standards-based education to one endorsing health-related experiences and development of the whole child as important part of a school curriculum. The recommendation for increase in policies around physical movement in school continued to gain momentum until the signing of the No Child Left Behind in 2002.

The No Child Left Behind law emphasized more instructional time consequently limiting and/or eliminating physical education and physical movement opportunities (Castelli et al, 2014). In spite of the momentum around increasing physical movement opportunities, the influence of No Child Left Behind caused school administrators to accommodate time reserved for physical movement to academic support programs and standardized test preparation. As a result of this law, students would become more sedentary and have fewer opportunities for physical movement during the school day.

Important advances have continued to occur with studies and organizations correlating physical movement and academic performance. Strong et al. (2005) provided a review that concluded that physical movement durations should increase

from 30 to 45 minutes for three to five days per week to 60 minutes daily and suggested that improved academic performance was an outcome of daily physical engagement. The Robert Wood Johnson Foundation's (2009) concluded that academic success does not increase when physical education is removed from the curriculum. The World Health Organization (WHO) recommends that children receive 60 minutes of moderate to vigorous physical movement daily (World Health Organization, 2010). They noted that because children spend the majority of their walking hours during weekdays at school, it is important for the schools to consider how different levels of physical movement influence student achievement.

In order to replace the No Child Left Behind Act, the Every Student Succeeds Act (2015) was implemented in order to increase academic rigor and hold school districts accountable for achieving academic goals (The Understood Team, 2018). The Every Student Succeeds Act is now the main federal law for K-12 general education and covers all students in public schools (The Understood Team, 2018). States had to begin adopting more rigorous academic standards in reading, math, and science (e.g., Common Core State Standards) and they had to begin setting achievement goals for students and schools would need to create a plan for improvement if they did not meet the state achievement goals (The Understood Team, 2018).

Positive Correlations in the School Setting

There has been an abundance of recent studies that have determined a positive correlation between physical movement and academic achievement in the school setting. Rosenstreich et al. (2022) conducted a study designed at investigating the effect of mindful movement on academic achievements among kindergartners. She defined *mindful movement* as acting mindfully by stressing the purpose of the action and monitoring its current state, which for this study would benefit academic achievements. This study consisted of 160 kindergartners that were divided into three groups: the mindful movement group, the movement for its own sake group; and the control group. The mindful movement group consisted of indoor and outdoor learning environments that integrated mindful movement with academic learning. Outdoor activities lasted 90 minutes per day and indoor activities consisted of movement learning centers that students rotated through for 90 minutes per day. Examples of mindful movement activities were writing numbers on the shelves of the climbing equipment and balancing on wooden blocks in the shape of letters. The movement for its own sake group consisted of movement activities provided to the students during inside and outdoors but the movement activities were only provided to the student without engagement for 90 minutes each day. Examples of activities included having playground facilities outdoors and providing small objects such as balls indoors. The control group learned in a conventional kindergarten classroom where most of the school day were allocated to academic learning. Movement was kept separate from learning centers and was provided outdoors for 45 minutes per day. Identical pre- and

post-academic achievement tests were given at the end of the first month of the experiment's school year, after the children were given an opportunity to adjust to kindergarten, and during the last month that same school year. The results shown that mindful movement group yielded higher achievement scores than the other two groups. This result supports the growing acknowledgment of the positive correlation of mindful movement on children's academic performance.

Another study was conducted involving kindergarten students that also included conclusions around how physical movement can impact student on-task behavior. Wiebelhaus & Hanson (2016) completed a case study to explore the impact of implementing physical movement in the classroom on kindergartner's off-task behavior and achievement. Three students were selected from a kindergarten classroom. A study was completed over eight weeks during specific times of the school day when physical movement activities were incorporated into the curriculum. The physical movement activities involved walking on balance beams, jumping on minitrampolines, crawling on mats, and using tweezers. Data sources included student interviews, observation notes, videotaping, pre- and post-test scores, and frequency charts. Results of the experiment included the students indicating enjoyment of the physical movement stations, the students' attention-span in whole group instruction increased after participating in an academic station involving physical movement, and they achieved significantly higher academic results after implementation of the physical movement activities. These results provide evidence

that classroom-based physical movement activities have advantages and can support student achievement and on-task behavior.

Research has also been conducted around students of upper elementary students. Reed et al. (2010) examined the impact of integrating physical movement with elementary curriculum on academic achievement. 155 third grade students from six classrooms participated in the study. 80 students were randomly assigned to the experimental groups which integrated physical movement (e.g., running, hopping, walking) into their core curriculum approximately 30 minutes per day, three days per week. Physical movement in the experimental group was measured with a pedometer worn on the hip. The remaining 75 students were placed in the control group. Fluid intelligence measures and state-mandated achievement tests were used to determine results of the experiment. Results from the study included the experimental group children averaging approximately 1200 pedometer steps per physical movement integration day. The children also performed better on the intelligence tests and on the state mandated academic achievement test. These results provide evidence that physical movement can influence academic achievement of elementary-age children.

Another option of physical movement that has been positively correlated to student achievement is recess. Beighhle (2012) defined recess as scheduled outside of class time and allows students to engage in physical and social activities of their choice.' A 20-minute recess period can contribute to 5 to 40% of a child's daily physical movement (Ridgers et al., 2006). With how important the physical movement is for a student, only 20% of school districts in the United States require

daily recess for elementary students, and fewer than half of these require at least 20 minutes (Centers for Disease Control and Prevention and Bridging the Gap Research Program, 2014). Erwin et al. (2019) completed a study in order to determine the effect of doubling recess time on elementary students' academic achievement over two school years. Participants in the study included 728 kindergarten to sixth-grade students from an elementary school. The study took course during the 2016-2017 and 2017-2018 school years. During the 2017-2018 school year, a new recess schedule was provided to teachers including two recess breaks per day (one recess break per day in the 2016-2017). Teachers were given supplies (e.g., soccer balls, basketballs) for outdoor recess and given resources (e.g., Take10 and GoNoodle) for indoor recess sessions. Teachers were provided training by the district technology staff on how to use the resources. Academic achievement would be reflected through the students' math and reading performance on different academic assessments. Results of the study found that the addition of one recess positively impacted all students' math achievement outcomes however it did not appear to improve the reading achievement scores.

Despite the positive correlation between an additional recess and mathematic achievement scores, Erwin et al. (2019) did provide possible conclusions as to why the reaching achievement scores were not positively impacted. They concluded that it may be possible that students' growth in math achievement is easier to determine in a study of shorter duration than reading achievement. Although these results did not provide positive correlations for both math achievement and reading achievement, the

addition of time for physical movement did positively impact the students' academic achievement.

Traditional Classroom vs. Flexible Seating Classroom

Students spend 180 out of 365 days at school each year. (Michigan Legislature, 2022). Research has also shown that students attending traditional seated classrooms spend approximately 97% of their day seated in the school environment (Cardon et al., 2004). These two statistics makes the classroom setting an idyllic setting for incorporating physical movement.

Classroom space can be a challenge for teachers to effectively utilize when a typical classroom is comprised of 20-25 students, a desk and chair for each student, learning stations created around the classroom, teacher desk/work area, classroom library space, and technology integration. In order to better manage the space in a classroom, schools have begun to eliminate stationary desk and chairs and replace 'traditional classroom furniture' with 'flexible furniture' which are work surfaces and seating that provide and support student choice of seating, location, and comfort (Attai et al., 2021). In classrooms that utilize flexible furniture, students are able to move easily and reconfigure. Currently in the PK-12 school system, there are only minimal studies discussing the effects of the classroom learning environment and classroom furniture on the students' perception of the environment (Attai et al., 2021). Attai et al. (2021) and Meade et al. (2016) were a few that were able to conduct research around classroom furniture.

Attai et al. (2021) conducted a study to investigate how flexible furniture impacts student physical movement and perceptions of the learning environment. 10 third and fourth grade classrooms were included in this study and were observed biweekly for eight weeks and assigned to one of two groups: Group A received teacher professional development and flexible furniture while Group B maintained traditional furniture (Attai et al., 2021). Data was collected through classroom observations and self-reported student survey data. At the beginning of the study, three students were randomly chosen from each classroom and were monitored throughout each observation (Attai et al., 2021). Results of the study showed that students in classrooms equipped with flexible furniture perceived their classroom as more comfortable than did students in classes with traditional furniture (Attai et al., 2021). Reasoning for this result may have been around the flexible furniture being new and colorful which could have led students to the positive feedback. Students in both settings did report that the seating was uncomfortable. These findings can conclude that furniture and classroom design are factors in students' perceptions of their learning environment (Attai et al., 2021). Another result showed that the classroom equipped with flexible furniture provided opportunities for students to move around the classroom.

Another study was conducted with students in relation between academic achievement, flexible furniture, and physical movement (Mead et al., 2016). They compared mathematics test scores of sixth grade students who used stability balls during class with those that were provided brief movement breaks and those that

remained in a sedentary classroom environment. They found that test scores were significantly higher for the class that used the stability balls when compared to the sedentary class. Test scores were significantly higher for students for using the stability balls than for the class that engaged in movement breaks. They developed two possible reasons as to why stability balls could improve academic performance. First, stability balls provide stimuli to students as they control posture and muscle tone in order to maintain balance which could produce a level of awareness that can help with facilitating learning. Second, students may have found it difficult to change their seated position on the stability ball in response to any distracting stimuli and as a result remained focus during instruction.

Contrary to the previous study, there have been several studies that found that different forms of flexible furniture (e.g., stability ball, cycling desk) usage had no effect on student academic performance (Fedewa et al., 2015; Torbeyns et al, 2017). While the flexible furniture usage did not interfere with academic performance, these studies concluded that the flexible furniture did not have a beneficial effect on student academic achievement. On-task behavior did improve for students in both studies despite no positive impact on academic achievement scores (Fedewa et al., 2015; Torbeyns et al, 2017).

Summary

There has been an abundance of research directly supporting the positive correlation between academic achievement and physical movement dating back to 1967 (Ismail, 1967). Important breakthroughs have continued to build in supporting

the positive correlation. Despite the continued research supporting the positive correlations, there have many barriers that are preventing consistent incorporation of physical movement in the classroom setting. However, many school administrators and classroom teachers have been attempting alternatives to support with providing physical movement in the classroom setting which also meeting the academic expectations set by state legislation.

There are two primary barriers that are affecting the consistent implementation of student physical movement into the classroom. First, an increase in academic demands and expectations were placed on school administrators and teachers as a result of the No Child Left Behind Act of 2002. It highlighted more instructional time and as a result limited/cut physical education and physical movement opportunities (Castelli et al., 2014). School administrators must begin readjusting time reserved for physical movement in order to provide further academic supports to meet the increase in academic demands and expectations. As a result of this law, students would become more sedentary and have few opportunities for physical movement during the school day. Second, the State of Michigan does not currently provide specifics around the number of minutes students must attend physical education and it does not require daily recess in elementary schools (Teachout, 2016). The United States Department of Health and Human Services (2008) recommend that a minimum threshold of 60 minutes of moderate to vigorous movement should be provided to children. With the increase in academic demands placed on administrators and teachers and no specifics on the number of minutes

required for physical education and recess, the students are spending a majority of their days in the classroom without physical movement.

There has been an abundance of research directly correlating student physical movement with an increase in student achievement (Rosenstreich et al., 2002; Reed et al., 2010; Wiebelhaus & Hanson, 2016). Each of these research studies were conducted on elementary-age students and consisted of comparison studies of subgroups of students who had physical movement incorporated into their classroom setting and groups that continued with a traditional classroom approach (i.e. students only participated in physical education and recess). All three research studies provided evidence that physical movement incorporated into classroom settings can influence academic achievement on elementary-age students. Recess is an effective option for student physical movement that has been positively correlated to student achievement (Beighhle, 2012; Erwin et al., 2019). A 20-minute recess period can contribute to 5 to 40% of a child's daily physical movement (Ridgers et al., 2006). Unfortunately, only a small amount of school districts in the United States require daily recess for elementary students (Centers for Disease Control and Prevention and Bridging the Gap Research Program, 2014).

Students spend approximately 97% of their school day seated in the school environment (Cardon et al., 2014). Flexible seating has become an idyllic option for incorporating physical movement into the classroom setting. Schools have begun to eliminate stationary desks and chairs and replace traditional classroom furniture with flexible furniture (Attai et al., 2021). Different forms of flexible furniture include

stability balls and stools, standing desks and wiggle cushions. Studies have shown positive correlations for higher academic achievement with students equipped with flexible furniture and provided options of flexible seating.

Conclusion

With students spending a majority of their school day in their classroom setting, it is empirical that the barriers are investigated and solutions are determined to help support students in improving their academic achievement. School administrators and teachers continue to face increasing expectations for student achievement and student physical movement being limited/cut as a result. In order to support the increasing pressure around increasing student achievement, it is critical that school administrators and teachers receive professional development courses around student physical movement in the classroom research, how physical movement can be incorporated simultaneously during a lesson, activity, or station, and the abundance of studies resulting in positive correlations between student physical movement and student achievement.

Chapter Three: Project Description

Introduction

With the increase in academic demands on elementary students, students are lacking opportunities for physical movement within the classroom which is adversely impacting student achievement. Despite research indicating the importance of physical movement on student development and brain growth (Jensen, 2005) and the United States Department of Education (2008) recommending that students receive a minimal threshold of 60 minutes of moderate to vigorous movement daily for children and adolescents, students are remaining more sedentary each day in the classroom and not being provided opportunities for physical movement. The amount of physical movement offered in school in the United States has declined over the past several years (Kohl & Cook, 2013; Turner et al., 2010). Teachers and administrators are facing increasing pressure set by the Every Student Succeeds Act (2015) which has increased academic standard rigor and enforced student achievement goals for all public schools. As a result, administrators have had to accommodate time reserved for student physical movement (e.g., recess and physical education classes) in order to increase time spent on academic curriculum and preparing for state academic achievement tests.

The purpose of this project is to provide teachers and administrators with professional development slides around the research, strategies, and examples for incorporating physical movement into elementary academics during the school day. By providing elementary teachers with the research, strategies, and examples, the

hope is to provide students with more opportunities for physical movement which will improve student academic achievement. Research has concluded that many teachers and administrators are unaware of what research says about the importance for learning and how to adapt activities for classrooms to support student academic achievement (Reilly et al., 2012; Webster et al., 2017).

This chapter will provide a detailed description of the project designed to provide a solution to the problem. It begins with a discussion around the components of the project which includes historical context, objectives of the project, rationale, and a description of the project. The next section will involve criteria for success for the project. This will be followed by conclusions that relate back to the original problem outlined in chapter one and how the research from chapter two was used to interpret the conclusions in this section. The final section will be around an implementation plan regarding the information gained from the project and how and when this information can be shared with other professionals.

Project Components

The professional development slides (see Appendix A) are specifically designed for elementary teachers and administrators who have students who reside in same classroom for the majority of the school day. The slides will provide the teachers and administrators with research around the importance and history of physical movement for children, recent federal legislation impacting physical movement in the school setting, studies with positive correlations between student physical movement and student achievement and positive correlations between

flexible furniture and seat with student academic achievement, and strategies and examples for incorporating physical movement and flexible furniture and seating into the classroom setting to increase student academic achievement.

With students becoming more sedentary in the classroom setting on a daily basis due to the increased academic rigor and demands, it is imperative that teachers and administrators receive professional development around the importance of student physical movement and how it can be incorporated during a lesson. A misconception can be that physical movement can only occur at recess or during physical education classes. Research has shown that student physical movement can be incorporated into lessons without taking important time from academic instruction (Castelli et al., 2014; Rosenstreich et al., 2022; Reed et al., 2010; Wiebelhaus & Hanson, 2016). It is not sufficient enough for teachers and administrators to learn about the research of student physical movement and how it impacts student development and the brain, teachers and administrators must also be provided with strategies and examples of implementing student physical movement in the classroom setting. The professional development slides will fulfill that need for teachers and administrators with the goal of increasing student academic achievement in the classroom.

In the first section of the professional development slide show, information is provided relating how student physical movement impacts a child's brain. The movement provides a child's brain with oxygen, which is needed to create and feed connections between neurons (Jensen, 2005). When the neurons are active, the

students are more likely to be engaged and focused during a classroom lesson or activity (Jensen, 2005). This leads to a discussion around the importance of students needing more physical movement at school. Elementary students spend approximately 97% of their school day seated in the school environment (Cardon et al., 2004) and spend 180 out of 365 days at school each year (Michigan Legislature, 2022). This makes the classroom setting an idyllic location for incorporating physical movement.

The next section of the professional development slideshow focuses on the federal legislation that has occurred over the past two decades that has impacted the amount of the physical movement in the classroom setting. The No Child Left Behind Act of 2002 and the Every Student Succeeds Act of 2015 both emphasized more rigorous instructional time which consequently limited physical education courses and opportunities for physical movement. The United States Department of Health and Human Services and the World Health Organization provided recommendations for the amount of physical movement a student should participate in daily.

The third section discusses the different research studies that have found a positive correlation between student physical activity and academic achievement. Rosenstreich et al. (2022), Wiebelhaus & Hanson (2016), and Reed et al. (2011) conducted research studies on elementary students ranging between kindergarten to third grade. Each study divided up the students into different groups in order to compare the effect of blending physical movement into daily schedules versus a traditional daily schedule without physical movement blended in. All three studies

concluded that students who were provided frequent opportunities for physical movement blended into their schedule achieved higher on achievement tests than students in traditional classroom schedules.

The fourth and final section provides strategies and examples for incorporating student physical movement and flexible seating and furniture in classrooms. Examples of how physical movement into an academic lesson are provided including activities such as Stand-Sit Warm-Up, Four Corners, and Order Up (Helgeson, 2011; Orłowski et al., 2013). Strategies for integrating movement into the classroom are given to support teachers who may be unsure of how to who to talk to or how to begin the implementation process. Flexible seating is another strategy for providing student physical movement without taking away from increasing academic expectations. It is defined and examples are given that can be used in a classroom setting. Attai et al. (2021) and Meade et al. (2016) conducted research studies that determined positive correlations between flexible seating and academic achievement are discussed and insights are given for teachers, administrators, and policymakers.

Project Evaluation

To evaluate the effectiveness of implementation of student physical movement into classrooms, students' test scores will be compared to student's test scores prior to implementation of movement. A pretest and posttest document was created and included (see Appendix B). For data reliability, it is recommended that the comparison of test scores should be from the same academic subject (mathematics, reading, writing, science, or social studies). The teacher will document

test scores for each student prior to implementing or increasing the amount of physical movement. The movement type will be defined on the document. The teacher will implement or increase the amount of physical movement for at least six to eight weeks prior to providing a posttest to determine effectiveness. It should be noted that physical movement breaks are one of several components that are research-based and can influence the effectiveness of student academic achievement.

If scores on the posttest increase, it is concluded that the implementation or increase of physical movement is effective. Questions for further thinking are provided on the document to establish how the effective movement can be incorporated into other times of the school day or to establish changes or revisions to the movement could be done to support increasing student achievement. These questions will provide teachers with next steps in order to continue improving student achievement.

Project Conclusions

Due to inconsistencies in guidelines and guidelines for student physical movement in elementary schools, every school can determine their own understanding of how movement is or is not incorporated into academic lessons. Currently, the State of Michigan mandates that elementary schools provide students with physical education but does not specify the number of minutes per week and furthermore does not require daily recess in elementary schools (Teachout, 2016). With the increasing academic rigor and expectations placed on teachers and administrators as a result of recent federal laws (No Child Left Behind Act of 2002,

Every Student Succeeds Act of 2015), less time is being devoted to providing physical movement breaks for students. As a result of all of this, it is imperative that teachers and administrators be provided with professional development around the importance of student physical movement, the abundance of research correlating physical movement and student achievement, and be provided strategies and examples of how to incorporate student physical movement into academic lessons and daily schedules in the classroom. With the information provided in the professional development slides (see Appendix A), teachers and administrators should be able to create a plan for increasing student physical movement that can be either school-wide or individualized by classroom teachers in order to meet their student needs and increase academic achievement.

Teachers and administrators can be provided with historical and scientific information on why student physical movement is important for the brain and academic achievement, but research (Rosenstreich et al., 2022; Wiebelhaus & Hanson, 2016; Reed et al., 2011) has concluded that teachers and administrators must be provided with strategies on how to successfully integrate research into classroom practice. The project provides specific examples of integrating student physical movement and strategies on how to begin and continue the process of integrating physical movement into a classroom setting.

With students being expected to show growth during a school year, it can be challenging to determine what may have caused students to show progress on academic achievement tests. There are many components in the classroom setting that

benefit students and promote academic achievement. Student physical movement is one component however it is research-based and determined through research to correlate with academic achievement. It is the hope of every teacher and educator to see each and every student demonstrate academic growth and achievement and providing them with physical movement puts students one step closer to achieving academically.

Plans for Implementation

The professional development slides will be presented to first- through third grade classroom teachers at a large, rural, elementary school. The teachers of these grades will receive the presentation at a school professional development day prior to the start of the 2022-2023 school year. The slides will be discussed and it will be recommended that grade levels discuss the slides further during grade-level planning time later during the day. The slides will be discussed again during a portion of the first staff meeting in September and teachers will be expected to provide a baseline of what student physical movement currently looks like in their classroom and a specific movement activity they would like to integrate into their schedule. Teachers will be provided the pretest and posttest document to determine effectiveness. They will hold off on integrating the new movement activity until they have collected a pretest achievement test score for their class. Once pretest scores are collected, the teacher will then introduce, model, and integrate the movement activity into their schedule. After six to eight weeks, the teacher will provide a posttest in the same academic subject as the pretest. They will collect the posttest achievement test score for each

student and then analyze the pretest and posttest scores to determine if achievement scores increased. The teacher will then expand his/her thinking by completing the questions on page two of the pretest/posttest document in order to determine next steps. During the staff meeting in January, teachers will break up into grade levels to discuss their class results on if achievement scores improved as a result of integrating the student physical movement activity. While with their grade levels, teachers will document on paper what type of movement activities were integrated and how students have benefitted. The papers will be collected and summarized for all teachers. This will provide teachers with different movement activities used across the school. Based on information collected from teachers regarding evaluation, the slideshow may be tweaked (specifically the strategies/examples of integrating student physical movement) for use for the next school year. Further time from a staff meeting could be used to allow teachers to volunteer to discuss examples of movement breaks that are improving student academic achievement in their classrooms.

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Appendix A

Incorporating Physical Movement in your Classroom to Increase Student Achievement

Andrew VanderWal

Physical Movement and the Brain

- Physical movement has been determined to be an important aspect in brain development for children of all ages.
- Movement provides the brain with oxygen, which is needed to create and feed connections between neurons. These connections are important for children because the part of the brain used during movement activities is used during learning. When the neurons are active, the students are more likely to be engaged and focused during a classroom lesson or activity (Jensen, 2005).
- Research has shown that students who are engaged and sustaining focus during a lesson are more likely to increase achievement scores (Meade et al., 2016).

Agenda

- Why is physical movement in a classroom important?
- Historical context around physical movement
- Studies positively correlating physical movement and student achievement
- Strategies for incorporating physical movement into your classroom

Why is physical movement in a classroom important?

- Students spend 180 out of 365 days at school each year. (Michigan Legislature, 2022).
- Research has shown that students attending traditional seated classrooms spend approximately 97% of their day seated in the school environment (Cardon et al., 2004).
- Elementary students primarily stay in the same classroom for academic instruction and do not transition to other classrooms frequently unlike students in middle school and high school.
- As a result, elementary classroom setting is an idyllic setting for incorporating physical movement.

Historical context impacting
physical movement

- There was an increase in research correlating student physical movement and student achievement and a push for Federal policies around student physical movement in schools up until 2002.
- No Child Left Behind Act of 2002
 - Emphasized more instructional time which consequently limited physical education courses and physical movement opportunities during the school day (Castelli et al, 2014).
 - School administrators had to increase time for academic support programs and standardized test preparation.
 - As a result, students became more sedentary and had few opportunities for physical movement during the school day.

- The Every Student Succeeds Act (2015)
 - Replaced the No Child Left Behind Act (2002)
 - Implemented to increase academic rigor and hold school districts accountable for achieving academic goals (The Understood Team, 2018).
 - It is now the main federal law for K-12 general education and covers all students in public schools (The Understood Team, 2018).

Current Mandates & Guidelines

- Currently, the State of Michigan mandates that elementary schools provide their students with physical education but it does not specify certain minutes per week and does not require daily recess in elementary schools (Teachout, 2016).
- National physical movement guidelines suggest that a minimal threshold of 60 minutes of moderate to vigorous movement should be provided daily to children and adolescents (U.S. Department of Health and Human Services, 2008).
- The World Health Organization recommends that children receive 60 minutes of moderate to vigorous physical movement daily (World Health Organization, 2010)
- Due to the *inconsistencies in mandates and guidelines* for student physical movement in elementary schools, this can create inconsistencies amongst elementary schools across the nation and look different from class to class, grade to grade.

As a result.....

Creating a plan to increase student physical movement will need to be individualized by classrooms and schools as there are minimal requirements around the amount of physical education needed per week in addition to the amount of recess needed daily.

Studies positively correlating physical movement and student achievement

Rosenstreich et al. (2022)

- Investigated the effect of physical movement on academic achievements among kindergartners.
- Students divided into three groups: physical movement integrated into lessons/schedule, physical movement provided without engagement, and the control group (traditional classroom).
- Identical pre- and post-academic achievement tests were given during first and last month of school year.
- The results shown that physical movement group yielded higher achievement scores than the other two groups.

Wiebelhaus & Hanson (2016)

- Explored the impact of implementing physical movement in the classroom on kindergartner's off-task behavior and achievement.
- Completed over eight weeks during specific times of the school day when physical movement (e.g., walking on balance beams, jumping on minitrampolines, using tweezers to sort items) activities were incorporated into the curriculum.
- Results of the experiment included:
 - the students indicating enjoyment of the physical movement stations.
 - the students' attention-span in whole group instruction increased after participating in an academic station involving physical movement.
 - and they achieved significantly higher academic results after implementation of the physical movement activities.

Reed et al. (2010)

- Examined the impact of integrating physical movement with elementary curriculum on academic achievement among third grade students.
- Students divided into two groups: physical movement integrated into lessons/schedule (approximately 30 minutes per day, three days per week), and control group (traditional classroom).
- Fluid intelligence measures and state-mandated achievement tests were used to determine results of the experiment.
- Results from the study included the experimental group children averaging approximately 1200 pedometer steps per physical movement integration day. The students also performed better on the fluid intelligence tests and on the state mandated academic achievement test.

As a result...

- These results provide evidence that physical movement can influence academic achievement of elementary-age children.
- Each researcher concluded that teachers and administrators should be provided with strategies and professional development to successfully integrate research into classroom practice.

Strategies and Examples for
Incorporating Physical Movement
into your Classroom

Examples of Integrating Physical Movement into Lessons

Vocabulary around the Classroom (Helgeson, 2011)

- Purpose is to energize students and break up notetaking while seated.
- Teachers should determine 10 or fewer vocabulary words/key points for a lesson that students should know.
- Each word/key point should be written in large letters, visible around the classroom, and spread out.
- Students should be instructed to copy down the words and definitions (or key points) in any order.
- Up to three students at each word/key point and will rotate per teacher discretion.
- Once all students have completed the activity, the teacher will facilitate a discussion around the words or notes.

Examples of Integrating Physical Movement into Lessons

Stand-Sit Warm-Up (Helgeson, 2011)

- Purpose is to provide movement to prepare students mentally for new material or review discussion of previously taught material.
- Prior to the lesson, the teacher creates a list of questions about the new topic or materials to review. All students initially stand up for the activity.
- The teacher begins by asking a question. Students raise their hands if they know the answer. The teacher calls on someone. If the student answers the question correctly, he or she sits down and must remain quiet. The activity continues until all students are sitting or until all questions have been answered.
- An alternative would be students standing nearby the student who answer the question correctly also sit down.

Examples of Integrating Physical Movement into Lessons

Four Corners (Helgeson, 2011)

- Purpose is to provide movement in order for the teacher to understand what students know about a lesson or topic.
- Prior to class, the teacher should hang numbers or letters in the four corners fo the classroom. The teachers should also prepare a few questions with four possible answers.
- The teacher either orally reads the questions or student read the questions off the board, students selects and answer, writes down answer and then moves to the corner that indicates their answer to the question.
- By writing down answers, the teacher can verify students are being honest.
- Seeing answers selected by students can lead to interesting discussions.

Examples of Integrating Physical Movement into Lessons

Give One, Get One (Orlowski et al., 2013)

- Students create T-Chart with left column titled "Give One" and the right column titled "Get one."
- Students list answers to a question (e.g. What is your favorite snack?) in the "Give One" column. Students then walk around to other classmates and ask for one idea to write in the "Get one" column. The student provides a "Give one" answer as well.
- The list is then used in a class discussion and lesson exploring the different answers for the given question/topic given by the teacher.

Examples of Integrating Physical Movement into Lessons

Hit the Deck (Orlowski et al., 2013)

- Students roll two dice and add/subtract/multiply/divide the numbers represented over the on the dice.
- Different movement activities (e.g., push-ups, sit-ups, jumping jacks) are associated with the different numbers on the dice.
- After the students answer the equation, the students participate in the movement activities.

Examples of Integrating Physical Movement into Lessons

Order Up (Orlowski et al., 2013)

- Students are given a card of a food item (e.g., vegetable, fruit). Students pair up with a picture of a similar color.
- The teacher will repeat increasing the number of students in a group and prompting students to pair up with foods of different colors.
- Students then share the food item on their card with the class.
- This activity is part of a nutrition activity aimed at increasing the number of colorful food items eaten by students. This could be altered for other science topics.

Strategies for Integrating Movement

- Review your school handbook or policies to determine if guidelines exist around student physical movement activities in classrooms.
- Talk with your building administrators around their perception around student physical movement activities incorporated into the classroom schedule.
- Talk with your mentor or grade-level teachers around how they incorporate student physical movement.
- If a committee does not exist, look into establishing a school wellness committee to develop and implement plans for incorporating physical activity into the school day.

Strategies for Integrating Movement

- Incorporate physical movement when it matters most
 - Lengthy times in schedule when students are sedentary
 - Before, during, or after tests
 - Before new units are introduced
 - After lengthy times students are out of the classroom (lunch, recess) to support students in refocusing
- Provide verbal expectations for the physical movement activity in order to support purposeful, on-task student movement.
- Document effectiveness of physical movement activity to help with determining correlation with student achievement and providing rationale for incorporating physical movement.

Flexible Seating Options

- Defined as work surfaces and seating that provide and support student choice of seating, location, and comfort (Attai et al., 2021).
- Students are able to move more easily and reconfigure while engaging in the academic lesson.
- Seating options are moveable and reconfigurable to help support minimal space in classrooms.
- Provides a variety of seating options to meet the learning needs of all students.
- Research (Attai et al., 2021; Meade et al., 2016) has shown positive correlations between students being provided opportunities for flexible seating and increase in student achievement.

Flexible Seating Options

Examples

- Bean Bag Chairs
- Rocking Chairs
- Wobble Stools
- Exercise Balls
- Seat Cushions
- Soft Seating Options for Comfort
- Option to work standing at desk or sitting on floor
- Adjustable height desks and tables

Flexible Seating Options

- Findings of positive correlations show the need for teachers and administrators to view the classroom learning space as an additional component that influences the effectiveness of student academic achievement (Attai et al., 2021).
- Insights from the research can be helpful to:
 - Teachers--equipping them with research around the effectiveness of classroom designs and furniture choices with the ultimate goal of improving student outcomes.
 - Administrators--to advocate for and allocate funding for modern learning environments equipped with flexible furniture.
 - Policymakers—provides them information to guide decision making around classroom design and equipment.

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Class Average:		Class Average:	
		% of Students Whose Score Increased	

Was physical movement activity effective in increasing student academic achievement? (circle)

Yes No

If effective, how so and how can it be used in other parts of the daily schedule?

If ineffective, what changes or revisions to incorporating physical movement could be done to increase student achievement?

Notes:

GRAND VALLEY STATE UNIVERSITY
ED 693/695 Data Form

NAME: Andrew VanderWal

MAJOR: (Choose only 1)

- | | | |
|---|---|--|
| <input type="radio"/> Adult & Higher Education | <input type="radio"/> Educational Differentiation | <input type="radio"/> Library Media |
| <input type="radio"/> Advanced Content Specialization | <input checked="" type="radio"/> Education Leadership | <input type="radio"/> Middle Level Education |
| <input type="radio"/> Cognitive Impairment | <input type="radio"/> Educational Technology | <input type="radio"/> Reading |
| <input type="radio"/> College Student Affairs Leadership | <input type="radio"/> Elementary Education | <input type="radio"/> School Counseling |
| <input type="radio"/> Early Childhood Education | <input type="radio"/> Emotional Impairment | <input type="radio"/> Secondary Level Education |
| <input type="radio"/> Early Childhood Developmental Delay | <input type="radio"/> Learning Disabilities | <input type="radio"/> Special Education Administration |
| <input type="radio"/> TESOL | | |

TITLE: Incorporating Student Physical Movement in the Elementary School Setting

PAPER TYPE: (Choose only 1)

SEM/YR COMPLETED: Spring/Summer 2022

- Project
 Thesis

SUPERVISOR'S SIGNATURE OF APPROVAL _____

Using key words or phrases, choose several ERIC descriptors (5 - 7 minimum) to describe the contents of your project. ERIC descriptors can be found online at:

<http://eric.ed.gov/?ti=all>

- | | |
|---------------------------------|-----------------------|
| 1. student physical movement | 6. flexible furniture |
| 2. physical movement | 7. |
| 3. student academic achievement | 8. |
| 4. academic achievement | 9. |
| 5. flexible seating | 10. |



The signature of the individual below indicates that the individual has read and approved the project of Andrew VanderWal in partial fulfillment of the requirements for the degree of Education Leadership.

Catherine L. Meyer-Looze

Catherine L. Meyer-Looze, Project Advisor Date

Accepted and approved on behalf of the
Educational Leadership Program

Riek Vandermolen

Richard Vandermolen, Graduate Program Director

Date

Accepted and approved on behalf of the
Educational Leadership and Counseling Unit

Catherine L. Meyer-Looze

Catherine L. Meyer-Looze, Unit Head

Date