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Spring 2022

## The Effectiveness of Incorporating Physical Activity into the Classroom: A Literature Review

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### Recommended Citation

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The Effectiveness of Incorporating Physical Activity into the Classroom: A Literature Review

Lauren Reynolds

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### **Abstract**

Keeping students engaged and achieving in their academic content in school is becoming a very difficult task for teachers all across the nation. A relatively new concept that many teachers and schools are attempting to try in order to accomplish this task is incorporating physical activity in the classroom. However, we still wonder just how effective this integration is and what are the effects across the various grade levels and subject areas? To answer this question, relevant articles were researched, and information was gathered on studies that have been previously done. Results show that overall physical activity incorporated in the classroom will support higher grades, an increase in concentration, a decrease in sedentary activity, among many other benefits. Physical activity is a strategy that has been shown to benefit students and teachers when integrated in the classroom.

### **Literature Review: The Effectiveness of Physical Activity in the Classroom**

All teachers want their students to achieve as much as they possibly can, and most teachers are constantly looking for effective ways in which they can help their students do just that. “Our findings emphasize the importance of student academic self-concept for determining engagement patterns and show that patterns of higher engagement led to higher achievement” (Schnitzler et al., 2020). Knowing that there is a direct link between student engagement and student achievement, it is imperative that teachers are always striving for new and exciting ways to keep students engaged, motivated, and wanting to learn. If they are able to do that, then their students are much more likely to achieve. An indicator of success as a teacher is usually when there is a high level of student engagement. However, realistically generating a high level of engagement within the modern classroom can be a challenge (ViewSonic, 2020). One strategy is incorporating physical activity into the classroom. This has been an increasingly common strategy amongst teachers as they have begun to use it to keep their students better engaged in the academic content they are learning. However, only 10.7% of elementary, 7.5% of middle school, and 2.2% of high school districts require schools to provide regular physical activity breaks during the school day (Stoepker & Dauenhauer, 2020). So, the question still stands: What are the effects of incorporating physical activity into the classroom, and what are the effects at certain grade levels and certain subject areas? The research done within this paper was obtained from professional websites, the University of Akron Libraries, and Google Scholar and was chosen based on the research studied and information offered. Also, the research within this paper will discuss what classroom physical activity is, the general effects it has on student achievement, performance, and movement, while also looking more specifically into its effects on certain grade levels and subject areas.

## **Methodology**

The research for this project was done by building on existing work and research. This review has examined qualitative and quantitative data to support its findings. While researching the existing work done on this topic for the review, the University of Akron University Libraries were used as well as Google Scholar. The University Libraries is an online library that is offered to the students at The University of Akron. While using these search engines and conducting the research, key words that were used include “physical activity in the classroom”, “improve achievement or performance”, and “effectiveness”. These words were paired with the specific grade level and subject area that was being researched at that time. All sources that were used to support this topic were chosen because they are peer-reviewed, they are primary sources of the study, and they were written by authors who are professionals in their field. Also, all sources that were used can be found and published on reliable sites such as the Centers for Disease Control and Prevention, Active Living Research, and Health Psychology Report. Each source that was chosen was written no more than 10 years prior to the current date to allow for the most up-to-date information in regard to the topic of incorporating physical activity in the classroom.

### **General Classroom Physical Activity**

Classroom physical activity is, “defined as any physical activity done in the classroom.” It can take place at any time and can occur in one or several brief periods of time during the school day. Classroom physical activity should be offered in addition to physical education and recess and at all school levels (Center for Disease Control and Prevention [CDC], 2018). This can be done by giving students physical activity breaks throughout the school day or by incorporating the physical activity into a planned academic lesson. According to Mullender-Wijnsma et al. (2016):

Integrating physical exercise into visual and auditory academic lesson content may have several benefits. First, sensorimotor information obtained by the body (for example, through physical activity) appears to be an effective aid to learning during childhood. Second, it has been found that moderate to vigorous physical activity that immediately increases activity in the brain may enhance attention, and this might cause enhanced academic engagement after physically active academic lessons. (p. 2)

Students can benefit from classroom physical activity by having improvement of concentration and the ability to stay on-task in the classroom, improving their motivation and engagement in their learning process, and helping to improve their academic performance like higher grades and test scores (CDC, 2019).

### **Effectiveness at the Elementary Grade Level**

The general idea about elementary grades is that at this age, it is necessary that students receive time during the day to exert their energy. Within these grades, students are generally given an allotted time for recess as well as a required PE class. However, schools often make the decision to reduce the number of PE classes in order to increase the number of academic classes (Podnar et al. 2018). Children's physical activity levels are declining, and they are spending more time participating in sedentary activities. This is important since students are in school for most hours of the day, 5 days a week, and for most of their childhood and teenage years (Podnar et al., 2018). A study was done on students in first to fourth grade to show the effects of 5-minute classroom based physical activity on students' on-task behavior. During the 12-week study period, teachers conducted a 5-minute physical activity in the middle of a 45-minute academic lesson. Many benefits came of this classroom-based physical activity including an increase of physical awareness in schools, an improvement in academic performance, and an effective

transfer of knowledge to pupils (Podnar et al., 2018). Overall, according to Podnar et al. (2018), the results of the study show a direct and positive correlation between having physical activity systematically implemented into the classrooms and on-task behavior in the elementary grades.

### **Effectiveness at the Middle Grade Level**

Limited research has been done in regard to the integration of physical activity into the middle grade classroom compared to the elementary and high school levels. However, research done by Active Living Research has offered some information on how physical activity in the classroom can affect middle school-aged children and also provides an overview of the effects that it has on the developing brain. Students of ages eleven and twelve, who participated in lessons involving physical activity, including fitness stations and team games at varied intensities, showed a greater recall percentage of vocabulary words on a memory task than students who did not participate in the activities. This suggests that participating in physical activity lessons may support immediate as well as delayed memory in students (Active Living Research [ALR], 2015). Looking at another study of 115 young adolescents, it shows that lessons requiring coordination like balancing and reacting were associated with better concentration on academic tasks (ALR, 2015).

### **Effectiveness at the High School Level**

Student achievement and performance in high school is very important. For those preparing for graduation, college, along with many other paths students will take, their academic achievement in high school will greatly affect their futures. A study was conducted to see if a group of high school students would be impacted if pedal desks were placed in the classroom. These pedal desks were placed under students' desks in order to allow students to maintain their

comfort and desk space while also increasing their physical activity (Cornelius et al., 2020). In this 14-week study, there was no increase in on-task behavior, therefore no increase in achievement. No other researched article was able to find these results, all others found at least a slight increase in achievement when physical activity was involved in the classroom. However, the authors discussed that there were several possible explanations for this result. One reason being that the activities being completed while using the pedal desks included completing quizzes, completing book work, organizing notebooks, and listening to lectures and presentations. According to Cornelius et al. (2020), the range in cognitive tasks may have impacted their ability to pedal and were a distraction during some of these activities. According to Stoepker and Dauenhauer (2020), only 27.1% of high school students participate in the recommended amount of physical activity per week and 29.8% attend a daily physical education class. A possible solution that could help address this low amount of physical activity in high school students is the integration of physical activity within the classroom. A study was done to examine high school teachers' and students' perceptions of classroom physical activity and what types of activities would be age appropriate for this grade level to maximize the participation of both parties in classroom physical activity. These perceptions are important to understand because integrating physical activity into the classroom at the high school level has shown positive effects on in-class student behavior, academic performance, and daily physical activity participation. It was found that both teachers and students value the integration of physical activity in the classroom, however, they have some differing views on various components that are involved in providing these opportunities (Stoepker & Dauenhauer, 2020). These differing views include implementation time of day and length of time of the implementation. However,

both students and teachers agreed in this study that yoga would be the best and most effective physical activity to do at the high school level.

### **Physical Activity in the Mathematics Classroom**

There is much research that has been done on the effectiveness of incorporating classroom physical activity to improve students' math performance. One recent study done in 2021 compared the effectiveness of teachers integrating physical activity into their math lessons using the 'Move for Thought' kit with taking activity breaks that had no connection to the subject being taught and traditional lessons. The study showed that out of the three groups, the first being a group participating in math lesson that integrated the 'Move for Thought' activities, the second being a group that took activity breaks that had no connection to the math lessons, and the third being a group that only received traditional lessons, the effects were the highest in the 'Move for Thought' group, involving physical activities related to the math curriculum (Mavilidi & Vazou, 2021). In another study, students were taught intervention lessons that incorporated physical activity for 15 minutes per day, 3 times a week, for 2 years. This math intervention required students to participate in activities such as jumping on a spot 8 times to solve the multiplication problem " $2 \times 4$ ". These lessons were done with the support of a presentation on the electronic whiteboard and the exercises were aimed at moderate to vigorous intensity (Mullender-Wijnsma et al., 2016). After 2 years of this intervention, analysis showed that significantly greater gain in mathematics speed test and general mathematics, and overall, these gains were equivalent to 4 months more learning compared to the group that did not participate in the intervention (Mullender-Wijnsma et al., 2016).

### **Physical Activity in the Science Classroom**

In a 7-week study, researchers integrated an Active Science curriculum into fifth and sixth grade science classes. These classes were 2 days per week and 90 minutes in length and met the learning objectives of that particular class and school. Students would participate in a particular physical activity during the class for a half of the class time on the first day. These physical activities would include hiking, tennis, along with others and students would spend approximately 45 minutes participating in these on the first day. On the second day, students would enter their physical activity information into the Active Science website, which would then show figures and data of the individual students as well as the entire class. According to Finn and McInnis (2014):

The students then completed the data analysis questions that focused on graphical interpretation and scientific inquiry. During the second half of class, the science teacher would teach the science content of the day and integrate the student PA (physical activity) data into the lesson. The science content focused on human body systems, nutrition, fitness, and scientific investigation. The teachers implemented their own handouts, readings, and information to help the students learn the science content. The key to the science content was that the teachers always integrated the students' PA data into the lesson. (p. 241)

As a result of this study, researchers found that incorporating physical activity into the science classroom such as a program like Active Science caused the students to enjoy the lessons because they felt it improved some behaviors in the classroom such as alertness, focus, and concentration. Teachers also felt that the students' science inquiry skills were improved as well

as an increase in science content knowledge, and that students were exposed to the use of technology during the lessons (Finn & McInnis, 2014).

### **Physical Activity in the Language Arts Classroom**

Incorporating physical activity into the language arts classroom can offer many benefits to students of all ages. Within most language arts classrooms, the main focus is reading and writing, which includes skills like reading comprehension, fluency, spelling, among many others. Active Living Research's (2015) study found the following:

After walking on a treadmill for 20 minutes at a moderate pace, children responded to test questions (in the content areas of reading, spelling, and arithmetic) with greater accuracy, and had a more intense response within the brain, than children who had been sitting. Further, children who walked for 20 minutes performed better on reading comprehension than those who sat for a similar length of time. Following physical activity, children also completed learning tasks faster and more accurately, and were more likely to read above their grade level. (p. 3)

Another study from 2018 compared students reading and writing scores when incorporating either academic-based breaks or aerobic-only breaks. Academic-based breaks were done by infusing the academic content into their physical activity and aerobic-only breaks were physical activity breaks without including academic content. Within the study, it was found that children showed significantly higher reading scores with aerobic-only movement breaks than academic-based breaks (Fedewa et al., 2018).

### **Physical Activity in the Social Studies Classroom**

At this time, there have been no findings published regarding this topic that meet the current selection criteria. There have been studies and articles written, however, because of the date of publication they are not able to be considered within this literature review.

### **Results**

After researching four different peer-reviewed articles, it was found that in the elementary grades physical education classes are being reduced to make more time for academics. Because of this, students are spending more time participating in sedentary activities (Podnar et al. 2018). A study showed that 5-minutes of classroom-based physical activity at the elementary level can increase the physical awareness of students and increase students' academic performance (Podnar et al. 2018). Also at the elementary level, it was found that there is a direct and positive correlation between physical activity being systematically implemented within the classrooms and on-task behavior (Podnar et al. 2018). Although limited middle level research has been done on this topic, it was found that students ages 11-12 that participated in physical activity like fitness stations and team games at varied intensities showed greater recall of vocabulary words on memory tasks, which tells us that immediate and delayed memory in middle schoolers may be supported while participating in physical activity within the classroom. It was also found that lessons involving coordination, like balancing and reacting, are associated with better concentration on academic tasks at the middle school level (ALR, 2015). At the high school level, it has been found that only 27.1% of students participate in the recommended amount of physical activity per week and only 29.8% attend a physical education class daily (Stoepker & Dauenhauer, 2020). Also, according to Cornelius et al. (2020), a study showed that utilizing pedal desks within a classroom to increase physical activity did not increase the amount

of on-task behavior. Because of this, there was no increase in performance. It was inferred that this could have been the result of the academic tasks impacting the ability to pedal while being distracted. Lastly, high school students and teacher were found to disagree on the time of day that physical activity would be implemented as well as the length of time in which it would take during the day. It was, however, found that students and teachers agreed that yoga would be the best and most effective physical activity to incorporate into the classroom at the high school level (Stoepker & Dauenhauer, 2020).

When looking at the various subject areas, the most widely studied among this topic was mathematics. Studies showed that the highest effectiveness was found when physical activity was related to the math curriculum that the students were working with compared to traditional lessons and physical activity breaks that were not related to any math curriculum. According to Mullender-Wijnsma et al. (2016), when students participate in physical activity that is integrated into the math curriculum, it was found that there was greater gain in the mathematics speed test and in general mathematics. These gains were shown to be equivalent to 4 months more learning, over 2 years, by these students compared the students who did not participate in the physical activity. Finn and McInnis (2014) studied a science class that integrated the students' own personal physical activity into the science lesson. It was found that students enjoyed this more than general science lessons because they felt that it improved their alertness, focus, and concentration. Also, teachers felt that because of this integration their students' science inquiry skills improved, they had an increase in knowledge, and they had an increase in technology use (Finn & McInnis 2014). Also, Active Living Research's (2015) study showed the effects of walking for 20 minutes in a language arts class resulted in an increase in accuracy on test questions and students had a more intense response within their brain than the students who did

not walk. It was also found that students shows significant increase in reading scores with aerobic-only breaks rather than academic-based breaks (Fedewa et al., 2018). This means that within the language arts class, students scored better when their breaks were not related to the academic material.

Overall, the results of multiple studies and research have shown that physical activity is going to benefit students. Even if there is no increase in achievement or performance academically, physical activity being integrated into the classroom will increase the necessary movement that children need because of the low percentage of physical activity breaks during the day that are required. Research shows that higher engagement in students results in higher achievement (Schnitzler et al., 2020). Lastly, incorporating physical activity into the classroom has been shown to result in students having an improvement of concentration, ability to stay on-task, improvement in motivation, and it will also improve performance resulting in higher grades and test scores (CDC, 2019).

### **Discussion**

The research and findings within this literature review has made me think about the idea of incorporating physical activity into the classroom much more than it ever has. After learning all of the benefits that come along with this integration, it makes me wonder why it isn't more prevalent than it already is. I realize, especially now that I have experienced teaching firsthand, all of the duties and responsibilities that come along with being a teacher, and how it could be a difficult task for teachers to add even more to their plate. However, after learning more about the topic, it is clear that adding this task may end up benefitting students and the class as a whole enough to make the extra time spent planning worth it. When students participate in physical activity in the classroom, whether integrated into the curriculum or not, they are more engaged in

what they are doing and will be more likely to continue to be engaged in the academic material they are working with. Because of this, I feel that physical activity in the classroom should be much more prevalent than it currently is. Also, after researching this topic and the various effects it can have on each grade level and subject area, I would say that it is much more easily integrated within the early childhood grade levels. I would say this because at this age, students are more likely to be willing to participate in various physical activities being integrated in their classroom. In my personal experience student teaching in a 4<sup>th</sup> grade class, students get very excited when they are able to get up out of their seat and dance, stretch, or do anything other than sitting still in a chair at a desk. In regard to the subject area, my personal opinion based on experience is that integrating physical activity is most effective when done in a mathematics classroom. Many students and people, of any age, have the preconceived idea that math is a boring and uninteresting subject and teachers tend to struggle to find ways to keep students involved in what they are learning in math. However, incorporating physical activity, whether related to the curriculum or not, can help students associate mathematics with a more exciting and fun feeling rather than a frustrated and unengaged feeling.

The type of physical activity that I find most realistic to implement into the classroom depends on the grade level. Within the elementary grades, I think that implementing physical activity that involves dance or some other type of faster paced activity would be the most effective choice. In my personal experience, students at this age have so much energy that they need to exert and an activity that requires more energy would help them. Also, an activity such as yoga may not be the most realistic at this grade level because it takes more concentration and stillness, which elementary students are not normally known to have. When thinking about the most realistic physical activity for middle grades, I think students would most enjoy participating

in physical activity that is integrate within the curriculum based on the literature review results and personal experience. At this age, students are starting to think certain activities are “uncool” and there may be some pushback on dances, yoga, and various exercises. Because of this, I think that having students choose their own physical activity and incorporating into the classroom material somehow would be the most effective and beneficial way for students around this age. Lastly, for high school students, I think that dances and exercises that require a lot of movement would not be as effective. However, I do think that a mixture of exercises like yoga and stretching along with an integration of students’ own personal physical activity like sports or outside exercise could be an effective strategy to increase high school students’ engagement in the classroom based on the results of this literature review.

When discussing the idea of incorporating physical activity into classrooms of all grade levels, there becomes the question of: Should it be the decision of the district/administration to implement physical activity, or should it be the individual teacher’s decision? In my opinion, it should be a district or administration decision as to what each classroom does in terms of the amount of time that is spent participating in physical activity. By allowing districts to make this decision and not just the individual teachers, I think that it will allow for more equitability within the schools, meaning each student will be receiving equal amount of activity. I do think, however, teachers should be allowed to have a say in what they think works best in their own classroom and what they think benefits their students the most. This will allow teachers to feel more involved while also benefitting the students.

### **Conclusion**

There are many different ways in which teachers can incorporate physical activity into the classroom and there are many different benefits that come along with doing so. Certain

physical activity will be more beneficial in certain grade levels than others depending on the age of the students and the type of activity. As we have seen, incorporating physical activity in the classroom can improve concentration, on-task behavior, and even overall test scores at any age and in any subject area. The physical activity being implemented can be connected to the academic material students are working with or it can be completely unrelated. Even if students do not improve academically, they are at least becoming more active during the day and spending less time being sedentary. After seeing the research that has been done on this topic, the benefits seem to speak for themselves. Teachers are always wanting their students to be engaged and having fun, while also learning and incorporating physical activity can help us do just that.

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