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PHYSICAL ACTIVITY IN EDUCATION

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Physical Activity in Education

Senior Thesis - Challenge 4

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Introduction:

“Mens sana in corpore sano” (Jones). Living a healthy and active life is one way to honor God by respecting the body that He gave to His creation. 1 Corinthians 6:19-20 commands, “Do you not know that your bodies are temples of the Holy Spirit, who is in you, whom you have received from God? You are not your own; you were bought at a price. Therefore honor God with your bodies.” Exercising and caring for one’s body shows reverence to God, demonstrating that His workmanship is valued. Though some may disagree with this logic, remaining active should be a priority, as it has been proven to have countless benefits across all areas of life. Thus, frequent exercise should be a mandatory requirement in all levels of public education to encourage each student’s overall health and brain function.

Background:

School is where most children in the United States spend a majority of their childhood. In the past, children received plenty of physical exercise daily. Growing up on the farm, running through fields and working long days, children were extremely fit and active. Today, children are growing up in an age of technology and a stronger focus on mental work. Now they spend many hours of their day sitting, either at school or at home. School is the place they gain knowledge of the world, form their opinions, and find their friends. It is also where they live a large portion of their lives. While parents have the responsibility of raising their children to be kind, generous, and responsible, teachers also have an important role since they spend upwards of 40 hours per week

with students. They are to guide students in their lives and learning as well as to encourage their overall well-being.

Post-secondary institutions, universities, and colleges have a long history with physical education. For many years most, if not all, universities had strict physical education requirements. They were viewed as a necessary and constructive part of a student's education. Amherst College became among the first to have a physical education program in 1861. Its purpose was, "to provide activities that would help Amherst students maintain their health and relieve the strain associated with their 'academic courses'" (Petruzzello and Box). The founders were keenly aware of many benefits and the necessity of prioritizing physical activity in education. William Augustus Stearns, president of Amherst at the time, stated, "Of one thing I am certain, the highest intellectual efficiency can never be reached, the noblest characters will never be formed, till a greater soundness of physical constitution is attained" (Petruzzello and Box). There is an undeniable connection between the academic and the physical, which throughout history has been recognized.

Primary and Secondary Education:

Education has taken many different focuses throughout history. Within the last 20 years that focus has been on increased academic performance. Along with programs such as Common Core and incentives like No Child Left Behind, there have also come sacrifices. Increasing the frequency of standardized tests has created a need for more time-consuming test preparation (Strauss). With schools striving to rank well, the tests have become a high priority, minimizing the necessity of other parts of education such

as physical activity and wellness. Across the country schools cut back on daily recess time as well as the frequency of physical education. According to the Center for Disease Control (CDC), in 2006 recess was not offered in one third of U.S. elementary schools (CDC). In the same year in New York, which “reflects national trends”, just under 4% of elementary schools implemented daily physical education, and nearly 60% of them only participated in physical education once per week (Chin and Ludwig). Despite being over a decade ago, these rates are extremely concerning considering the large amount of time children spend in school.

The goal of education should be to care for the entire child. With this comes more than just preparing students to perform well on tests. There are three learning domains in education: the cognitive, which “involves knowledge and the development of intellectual skills,” the affective, which “includes the manner in which we deal with things emotionally,” and the psychomotor, which “includes physical movement, coordination, and the use of motor skills” (Kuczala et al). Children need to be fostered in all areas of their education which includes allowing them time to release their full stores of energy.

According to the National Association for Sport and Physical Education, it is a necessity for children to receive active time in school. Their guidelines recommend, “children aged 5 through 12 accumulate a minimum of 60 minutes of activity each day and avoid long periods of inactivity.” In addition, “elementary schools [should] provide 150 minutes of instructional physical education each week and that middle and high schools provide 225 minutes per week” (The National Association for Sport and Physical Education). If recess and phy-ed are not being consistently provided, students are clearly not meeting these standards. According to the current statistics from the

CDC, 20% of U.S. children and teens are considered obese, making them medically at an increased risk for conditions such as energy imbalance, cardiovascular disease, type 2 diabetes, various cancers, and low bone density (CDC). This is undoubtedly in part because of the lack of physical activity (PA) they are receiving each weekday. In 2017 a mere 24% of children received the recommended 60 minutes of physical activity daily (CDC). These numbers should cause worry, and in many they have.

Educators and parents have seen firsthand the detrimental effects of reducing PA in the public schools. Fifth-grade teacher, Deb McCarthy, noticed a change in the amount of anxiety and behavioral problems in her students when recess was nearly eliminated. She stated, “there are schools where kids have no recess at all, because time once set aside for play is now dedicated to testing prep.” She expressed, “It makes me want to cry. I’ve been teaching for 22 years, and I’ve seen firsthand the change” (Shammas). Other educators have become distraught as well. One former physical education teacher, Debbie Rhea, explained, “We have forgotten what childhood should be. And if we remember back to before testing—which would be back in the ‘60s, ‘70s, early ‘80s—if we remember back to that, children were allowed to be children” (Shammas). As these teachers express, children are wired to be active and taking this necessity away from them is having detrimental effects.

In order to make physical activity a priority in public schools again, and to aid students in reaching the recommended amount of PA, multiple steps will need to be taken. Recess must remain an integral part of each elementary school day to allow for children to play freely and engage in the activities they enjoy with their peers. Additionally, physical education classes should take place regularly, around 3 times per

week for elementary school and 4-5 days per week in middle and high school. This will provide students with exposure to new sports, participation in many types of physical activity, and education in maintaining a healthy lifestyle. In addition, classroom “movement integration” should be incorporated into everyday education. This has been defined as, “infusing physical activity at any level of intensity, within general education classrooms during normal education time” (Densley et al.). These can take different forms such as PA breaks or lessons. Ultimately, the goal will be to create more active students, and stimulate their brains in new ways to make their learning more productive.

Both regular recess and consistent phy-ed (PE) classes will have positive effects on the students. Research shows that active students often receive better grades and have more consistent school attendance than students who live more sedentary lifestyles. In addition, higher amounts of activity are related to better cognitive functions such as memory and attention (CDC). Recess will provide an opportunity for children to be active while learning social skills, and PE will encourage a healthy lifestyle among the students.

While PE and recess don't directly show measurable academic benefits in studies, kinesthetic in-class movement does assist in learning. Simply understanding how certain parts of the brain work will allow one to see the academic benefits of in-class movement. Most often, students are taught through explicit means: memorizing, reading, and listening to lectures. With teachers cramming as much information into a 90 minute lecture as possible, students will quickly lose interest and become disengaged. Studies have shown the short length of students' attention spans. An elementary student is likely unable to be attentive for longer than 10 minutes, with high

school aged students following closely behind (Terada). Despite the commonly-used lectures, implicit learning, defined as “learning that takes place beyond our conscious awareness” is the preferred method of the brain (Lengel and Kuczala, 24). Often, this type of learning occurs through emotional arousal which can be accomplished through movement (Lengel and Kuczala, 24). Another benefit of scheduled breaks is that they will revive the brain through increased blood flow. When this occurs, the brain receives more oxygen and in turn allows the brain to refocus on the task at hand (Jensen). In addition, teachers will likely find that their students are absorbing more information. The hippocampus, where information is sent to be processed before storage, has a limited amount of space. When too much information is presented at one time, the brain simply cannot absorb it all (Jensen). Processing requires time, which providing brain breaks will accomplish. Though educators may feel the need to present long lectures crammed with information, in reality students will be incapable of absorbing it all. Kinesthetic movement is a necessary part of learning.

Measuring the indirect effects of physical activity breaks and lessons is difficult, however, when examined classroom interventions have shown positive effects on education and academics. A review of numerous studies in 2019 found positive effects linking attention, executive functions, and academic performance to physical activity (de Greeff et al). Executive functions are defined by Merriam Webster as, “the group of complex mental processes and cognitive abilities (such as working memory, impulse inhibition, and reasoning) that control the skills (such as organizing tasks, remembering details, managing time, and solving problems) required for goal-directed behavior (Merriam-Webster)”. Academic performance included improvements in mathematics,

reading and spelling. The review noted that the most promising interventions were those that included consistent physical exercise over a span of multiple weeks (de Greeff et al). Another study on elementary school children found that mathematics and reading outcomes improved by including “at least 20 minutes of physical activities into math and reading lessons for 20 weeks” (Kuchta). By requiring scheduled PA breaks or lessons, teachers should not be surprised if students’ academic performance is enhanced.

All students learn in unique ways, and there are countless differences between every pupil. While catering education perfectly to each student is an impossible task in the public schools, introducing PA in the classroom has proven beneficial to both boys and girls—the most noticeable division amongst students. Biologically, males and females are created differently, and these differences should be considered when teaching. Development occurs at different ages across the genders. Girls, for example, tend to speak at a younger age than boys. Hormone levels are also different between men and women. Males have lower serotonin and oxytocin quantities, chemicals which relate to bonding and impulse control (Munden). As a result of this, boys have a tendency to require larger amounts of play time, physical activity, and have more energy.

Introducing kinesthetic movement into classrooms will provide the necessary change of scenery and motion that boys require. One study required students to perform an even number of kinesthetic and non-kinesthetic activities over a series of weeks. The results were grouped according to the male and female participants. The male students remained on-task when performing the kinesthetic activity. A 58% decrease in distracted behavior was seen when participating in the movement tasks

(Munden). Though they may not eliminate distractions, kinesthetic and movement activities will reduce their prevalence, thus creating more time on task. The results found in the female students were similar, with a 77% decrease in distracted behavior when kinesthetic exercises were being performed, yet the female students had lower distraction rates to begin with (Munden). Another review found that “regarding classroom behavior, time spent on task (TOT) during lessons significantly increased in each of the included studies” (Masini et al.). Though it may appear that students will only become distracted, and this is certainly a possibility, evidence suggests that by stimulating the brain through exercise, students will ultimately become more focused. Although the need for kinesthetic learning is often more evident in boys, girls will also see tremendous benefits.

A unique program for girls called SHINE, has endeavored to create a curriculum for girls to stimulate them in STEM (Science, Technology, Engineering, and Mathematics) fields. In SHINE, girls are taught math through dance with the goal of equipping women for futures in predominantly male areas of study. After finishing the program, both personal and academic benefits in young girls are evident. On average there is an improvement of 184% in math scores with 88% of students thinking they are proficient at math by the end of the curriculum. In addition there is on average a 148% increase in personal confidence in the students. After the program, 91% of SHINE students were interested in a STEM career. (SHINE). The striking improvements seen in these students are encouraging, further proving the necessity of physical activity in the classroom. Clearly education can be successful in both boys and girls when completed in a non-standard way.

Along with the academic and cognitive benefits of kinesthetic learning, introducing physical activity will bring a new sense of excitement into the day. Because a large portion of students' lives are spent in school, making it enjoyable to them should seem logical. Students of all ages will likely be more excited for review games or active lessons, than sitting at a desk for a lecture. Particularly in elementary school, performing activities together can provide a sense of unity throughout the classroom. This will appeal to children who often feel on the outside. Less motivated students may find that learning can be enjoyable, thus engaging in class more often. Certain games will challenge students to think in new ways, and cooperate together as a team. Activities like this can improve their ability to problem solve and communicate with others effectively. Educators will likely discover class participation, cohesion, and motivation will improve as students begin to enjoy school more.

When examining if physical activity breaks and lessons are being used in public schools, there is evidence of sporadic use. "PA breaks" will be a short 5-10 minute period in which the class participates in stimulating movement or exercises. Requiring more preparation from the educator, "PA lessons" will include active review games and movement integration such as executing jumping jacks while reciting math facts. One finding noted that "adoption of PA breaks was nearly universally reported, with a weighted prevalence of 91.5%" (Densley et al.). Although the percentage of *schools* incorporating PA breaks is high, the evidence does not include the percentage of *teachers* within each school adopting PA breaks. Of the teachers who reported using breaks, 40% of them implemented breaks for 25 minutes per week, while only 20% provided 50 minutes per week. While this is encouraging, improvement is necessary

(Densley et al.). Findings for PA lessons, however, were different. “PA lessons improved mathematics outcomes more than PA breaks. Although there is more evidence about the educational benefits of PA lessons...adoption of PA lessons was reported less frequently than PA breaks” (Densley et al.). These findings suggest that there is room for improvement in the adoption of physical activity in the classroom. Over time, educators will find that including movement in the classroom in addition to physical education and recess will provide far more benefits than lengthy lectures ever could.

Post-Secondary Education:

In recent years, colleges and universities have shifted their attention away from physical education. The importance of strict academics has been pushed to the forefront, leaving the physical health of each student in the background. Former President John F. Kennedy recognized this even while he was alive. In an article for *Sports Illustrated* in 1960, he writes,

But the harsh fact of the matter is that there is also an increasingly large number of young Americans who are neglecting their bodies—whose physical fitness is not what it should be—who are getting soft. And such softness on the part of individual citizens can help to strip and destroy the *vitality* of a nation. For the physical (*and mental*) vigor of our citizens is one of America’s most precious resources. If we waste and neglect this resource, if we allow it to dwindle and grow soft then we will destroy much of our ability to meet the great and vital challenges which confront our

people. We will be unable to realize our full potential as a nation
Kennedy).

Here Kennedy sees the importance of individuals' physical health even as it pertains to the overall strength of a nation. Later he notes that many of the ways in which Americans used to receive daily exercise are now absent from our daily routines. If this was becoming an issue over 60 years ago, how much greater should one's concern be for young people today?

As many people are aware, mental health in young adults has been at a steady decline in recent years. Interestingly, so has physical exercise. According to data from the American College Health Association-National College Health Assessment Executive Summaries from 2008/2009 to 2018/2019 the negative impacts of stress on academics have increased from 27% to 33% with anxiety and depression increasingly impacting academics from 18% to 27% and 11% to 18.5%, respectively (Petruzzello and Box). Busy schedules, copious homework, and adjusting to life on one's own are all common to the life of every college student. A study report of over 60,000 college students from the 2018-2019 school year showed that nearly one-third of students "reported that emotional or mental difficulties negatively impacted their academic performance on at least 1-2 and as many as 6 or more days over the previous 4 weeks" (Petruzzello and Box). According to the Mayo Clinic, nearly half of college students reported symptoms of depression or anxiety within the last year. In addition, of those who develop mental illness, 75% show signs before the age of 24, demonstrating college age is a critical time in the mental health of a young adult (Mayo Clinic Health Service Staff). Many universities noticeably focus on maintaining a positive mental

health amongst their students, but what if they are missing a key aspect for making this vision a reality?

A recent study conducted during the recent COVID-19 pandemic showed an interesting link between a decline in physical activity and an increase in stress amongst college students. It found that “compared to before the pandemic and associated shutdown, 54.2% of respondents reported exercising less time while 47.9% exercised less intensely. Concurrently, 77.6% reported more stress and 40.4% reported worse academic performance (Morgan et al). Undoubtedly, other factors are at work in the midst of a pandemic, yet the sudden decline in exercise and its correlation to instantly higher stress levels suggest that obtaining adequate PA is vital to one’s overall health.

One concern regarding the mental and overall health of students is the time students are sedentary on an average day. Often, students spend large portions of their days reading and studying for their classes. While this may appear helpful to their academics, studies have shown that too much time sitting is extremely detrimental to the life of a student. One self-reported study on over 200 college students found that on average, each student spent nearly 8 hours per day sitting. This particular study also discovered that with an increase in sedentary time an increase in stress, anxiety and depression was also present (Lee and Yujeong). Even more concerning, a review of multiple studies found that the average sedentary time ranged from 10.7-11.1 hours per day depending on the type of measurement (Moulin et al). Engaging in such an extreme amount of sedentary time can cause detrimental health effects such as weight gain.

Nearly everyone has heard of the term “Freshman 15” in reference to the amount of weight one will inevitably gain in their first year of college. Although research has

proven that 15 pounds in one year is not necessarily true, there is a concerning weight gain during the college years. According to a meta-analysis of over 30 studies, on average over 60% of college freshmen gained weight over the course of the year with the mean weight gain of 7.5 pounds (Vadeboncoeur et al). The consistent pattern of excessive weight gain, the high levels of inactivity, and changes in lifestyle that all occur in college suggest that this is an issue in need of a solution.

When one combines the knowledge of PA's benefits on a healthy life with improved academics, it is easy to see why it would be necessary to emphasize PA in education. Yet, it is simply not. As academic rigor increases with grade level, a balanced lifestyle slowly disappears. A review from 2017 found that there is a consistent decline in PA levels as one moves through high school and into adulthood. Within this review, one study which examined 233 undergraduate students

Reported [that] physical activity levels decreased during the transition from high school to college years; 65% of students reported engagement in regular vigorous and 26% in regular moderate physical activity during high school. Upon follow-up however, during their college years 38% of students participated in regular vigorous and 20% moderate PA (Caletine et al).

These statistics show a significant difference between activity levels in high school and college.

To meet the World Health Organization's guidelines for physical activity, an adult over 18 years of age, "should do at least 150 minutes of moderate-intensity aerobic physical activity; or at least 75 minutes of vigorous-intensity aerobic physical activity; or

an equivalent combination of moderate- and vigorous-intensity activity throughout the week” (Physical Activity). Roughly half of American college students consistently meet these guidelines (Penglee et al.). With this in mind, consider a study from 2004 demonstrating that the rates of meeting these guidelines have not improved over the last two decades. It found that while 66% of freshmen in college reported sufficient amounts of PA in high school, by the end of the first two months of college only 44% met PA requirements. In addition, “34% of the students reported insufficient activity during high school, but 56% reported insufficient activity in college” (Petruzzello and Box). If more than half of college students, and possibly an even larger number of students due to the pandemic, are not receiving adequate amounts of PA, it seems logical that so many are suffering from mental health issues and weight gain.

To increase student mental health as well as encourage a healthy adult lifestyle, a physical activity requirement should be a part of every college program. Appearing in many forms, students should be required to take eight PA classes, one per semester, to graduate. The goal is for exercise to be enjoyable, thus carrying healthy lifestyle habits into adulthood. According to Richard Pringle, PhD, “encouraging a love of movement should take precedence over the medicalization and disciplining of the moving body” (Petruzzello and Box). Oftentimes exercise is viewed as a painful experience, one that requires phenomenal determination to have a drastic body transformation. Ultimately, however, exercise should be enjoyable as well as a way to stay mobile and healthy. One study found that when performing resistive exercise training, many positive effects correlated such as lower anxiety and depression, better sleep, and less fatigue (Petruzzello and Box). Thus, there are other forms in addition to aerobic exercise that

are beneficial. For this reason college campuses should offer a wide variety of classes ranging from yoga and zumba, to cycling and weight training, to tennis and soccer. Thus, classes will be suited to all fitness and intensity levels, a program where everyone can find something they enjoy.

The goal is that by instituting a PA requirement, students will live more active lives. The requirement will lower the amount of time spent being sedentary and increase the mental health of students on college campuses. A study from 2016 examined the effects of increasing sedentary time by 30 minutes per day. It found “an increase in mood disturbance. This...was associated with a larger stress-induced inflammatory response. These findings highlight the notion that too much time being sedentary, a common occurrence in college students, can potentially lead to negative mental health consequences” (Petruzzello and Box). When students are required to be active in their daily life, they will find their mental health improving and their study time becoming more focused. In addition, students will be encouraged to maintain healthy habits and lifestyles outside of the classroom. The PA requirement will re-energize and stimulate students’ brains on a daily basis.

Another set of studies examined by Petruzzello and Box showed the aforementioned mental health benefits when exercising. Students had “12-22% fewer days of poor mental health when compared with no exercise at all.” In addition, “any duration of activity was associated with reduced mental health burden, indicating the exercise itself need not be time consuming” (Petruzzello and Box). These studies also found that mental health benefited the most when exercise was done between 3-5 days per week (Petruzzello and Box). Physical activity has proven benefits to many areas of

life, one of which being mental health. As studies have shown, this physical activity does not need to be lengthy. Students will be able to configure this requirement into their everyday schedule while leaving an adequate amount of time for studying and peer activities. Research shows that college students can spend between 8-10 hours per day on their cell-phones (Penglee et al.). Since this is extremely excessive, there is plenty of room in a student's day to take 30 minutes to exercise. The PA intervention will greatly benefit the student population.

Finally, by instituting this requirement into colleges around the country, students will be more prepared for adult life. College is an in-between time where one begins to find their independence and purpose. It is during these years that students will form habits they will carry with them for the rest of their lives. While they are still being guided, it is important that they are capable of pursuing a healthy lifestyle when they leave. Currently, overweight and obesity levels are dangerously high. According to the Center for Disease Control, in 2017-2018 the "prevalence of obesity in adults was 42.4%" (CDC). With countless health conditions associated with obesity, it is imperative that efforts are made to bring these statistics down. A 2019 study by Moo Song and Cardinal found that "required PAE (physical activity exercise) policy allows for more students with lower self-determined forms of motivation (ie, amotivation) to be reached in comparison to the elective PAE policy" (Moo Song and Cardinal). By requiring students to participate, the hope is that they will become self-motivated due to the positive effects associated with exercise. According to a study examined by Petruzzello and Box, "85% of college seniors who were regularly active were at least as active, if not more active, when surveyed 6 years later; similarly, 81% of college seniors who

were non-exercisers reported the same or less activity 6 years later” (Petruzzello and Box). This demonstrates the habits made during this time last well into students’ adult lives. If students continue in their patterns of high screen time and hours of sedentary behavior, one can only imagine the detrimental effects these practices will have on the remainder of their lives.

Ultimately, creating a culture centered around being active will improve the overall health of the entire student body. Intramural sports and outdoors clubs can be promoted to incoming students. In addition, professors can make use of the outdoors in their classes. Biology labs or journals could be done while observing the nature that surrounds campus. For example, science professors from the University of Wisconsin LaCrosse take their classes hiking on the nearby bluffs to find specimens to observe. It will take time to make this a reality for many schools, however, which is why a PA requirement should be the first step to reach this vision.

Refutation:

Primary and secondary educators may feel implementing PA in classrooms is futile, and it is the responsibility of the physical education teachers to ensure the students are receiving adequate amounts of exercise. Indeed, gym teachers play a vital role in helping students to gain skills in sports and physical fitness. Yet, a teacher’s role is to educate the entire child, including the physical realm. By implementing this policy, educators will take part in a vital part of a child’s life, being active. Teachers will not be running a gym class, thus concerns about their own physical fitness levels are not valid.

Anyone can be active and the educators will only facilitate short breaks and active lessons to ensure the child's brain is reawakened and refocused.

Another common objection is the amount of funding and teacher preparation that will be required. The academic and overall benefits to the students will outweigh the inconveniences of implementation. Once teachers become trained in this new setup, they will be able to easily reuse lessons from previous years. Although the training for educators and the lesson plan formats will require some funding, it will be minimal as the current core curriculum will still be in use. In addition, a majority of PA breaks and lessons can be conducted with little to no extra materials. If teachers do need materials for their lessons, they will likely be common tools currently found in every classroom. Short PA breaks and lessons will be regular and scheduled. These can be as simple as students and teachers performing jumping jacks for one minute next to their desks or reciting math facts while playing hopscotch. Making these a regular part of the school day will have many benefits on students and their education.

Another argument opposing PA in classrooms is that students will become hyperactive or lack participation. Some elementary school children could become overstimulated during these breaks, which is why rules must be stated clearly and the type of physical activity catered to each classroom. In contrast, high school students may be uninterested and opposed to the idea. In these cases, gradual implementation, such as partner activities or group games, is necessary to make PA a regular part of classroom routines. Also, it is important for educators to command the respect of their students and to be involved. If educators have physical limitations, asking a student to lead a PA break is another option. If the students respect the expectations of the

teacher, they will participate. Eventually both the unmotivated and energetic students will come to enjoy the new movement and competitive nature of games.

One final objection to the implementation of this format in primary and secondary education is the amount of class time these breaks will absorb. Educators already feel pressed for time as they try to provide as much information in one period as possible. Thus, taking time to break up lessons creates a fear that a student's academic achievement levels will decline. The evidence previously stated, however, has proven that the method of instruction currently in use is not the most effective. When physical activity is incorporated, educators will likely find that the students absorb more information, making class time more productive. Even if the benefits are difficult to tangibly measure, implementing PA "did not detrimentally influence children's achievement and, instead, may have enhanced achievement" (Fedewa et al). Children will profit from this new class structure.

University boards will oppose this requirement, believing it unnecessary, as many institutions have state of the art exercise facilities. Because the mandatory phy-ed programs failed, colleges built these gyms with hopes that students would utilize them of their own accord. Data from the American College Health Association was compiled over 2008-2019. It "examined the percentage of students who self-reported engaging in sufficient physical activity to meet the guidelines for adults...In 2018-2019, that percentage was 44.75%. Thus, roughly half of the student population engages in sufficient physical activity, and that doesn't provide information on how many are using the campus fitness facilities" (Petruzzello and Box). Based on this information, likely less than 40% of students are utilizing their university's modern gyms. Those who do

take advantage of the fitness centers are often the self-motivated students and student athletes. Bradley Cardinal, a professor of kinesiology at Oregon State spoke against the myth that students are acquiring adequate exercise in the college facilities. He noted, "The very students that oftentimes might benefit the most from those centers typically don't use those centers. They're not conducive all the time to encouraging people to be in there and be physically active" (Goldberg). He adds that many students of varying backgrounds find the gyms intimidating. With this intervention the facilities recently built at many universities will be utilized by the entire student population, making exercise a priority in education.

Conclusion:

This thesis has provided numerous reasons that frequent exercise should be a mandatory requirement in all levels of public education. Physical activity has been proven to enrich academic achievement and stimulate brain functions for increased learning in the classroom. In addition, it will refocus attention on the topics at hand. Students in their college years will also benefit from instituting physical activity. Both their mental and physical health will be enhanced as they form healthy habits for the remainder of their lives. As this thesis has demonstrated, students are in need of regular physical exercise. Education must cater to mental intelligence as well as physical well-being, just as it has throughout history. As the Roman poet Juvenal stated, "Mens sana in corpore sano." Together let us provide students with "a healthy mind in a healthy body" (Jones).

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