

The Impact of Athletics on Student Achievement in
Middle School Students

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FACULTY APPROVAL

The Impact of Athletics on Student Achievement in
Middle School Students

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ABSTRACT

The researcher conducted a study about the impact of athletics on student achievement in the middle school. Students were divided into two groups, eighth grade students participating in three middle school athletic seasons and eighth grade students not involved in middle school athletics. The researcher used student's grade point average to measure student achievement. The pre-test and posttest design was used by collecting spring 2011 and winter 2012 grades from Powerschool grading system. In spite of extensive research in the area of athletics and academics, this study did not find conclusive evidence that students who participated in middle school sports had higher academic achievement than the students not involved in middle school sports.

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CHAPTER 1

Introduction

Background for the Project

Interscholastic sports promoted citizenship, sportsmanship, lifelong lessons, and facilitated the physical and emotional development of our nation's youth. The National Federation of State High School Associations (NFHS) stated that, "Students who participated in activity programs tended to have higher GPAs, better attendance records, lower dropout rates, and fewer discipline problems" (National Federation of State High School Associations, 2002, p. 2).

The importance of athletics during childhood helped encourage the development of leadership skills, self esteem, muscle development and overall physical health. Childhood obesity rates were dramatically increasing in the United States during the project. In adolescents aged 12 to 19 years, obesity increased from 5% to 18% over a period from 1980 to 2008. More than one third of children and adolescents were

overweight or obese in 2008 (Center for Disease Control and Prevention, 2012).

Statement of the Problem

Extra-curricular sports at the researcher's school lacked student participation. However, the numbers had increased in the years between 2009 to 2012. The school had not made Academic Yearly Progress (AYP) for the entire time the researcher had been teaching at the middle school, a period of 9 years (Office of Superintendent of Public Instruction, 2011). The intent of the study was to investigate whether extra-curricular sports had an impact on academics, either positive or negative.

Purpose of the Project

As a result of the project, the researcher wanted to find out if a student's participation in athletics helped maintain or increase a student's grade point average (GPA). If the results were positive, the researcher would have recommended continued or increased support of athletics for middle school students.

Delimitations

The researcher conducted the study at a middle school in a rural town in Southeastern Washington State with a population of 59,781, according to the 2010 US Census data (U.S. Census Bureau, 2010). The middle school served students in grades six through eight. According to the Office of Superintendent of Public Instruction (OSPI) in 2010, the school had an enrollment of 934 students in May of 2010 with 53.7% male and 46.3% female. The demographics of the middle school revealed that 94.8% of the students were Hispanic, 2.7% were White, 1.5% were Black, American Indian had 0.3%, and Asian/Pacific Islander were 0.2%. Of the 934 students, 96.7% qualified for free and reduced lunch and 17.3% qualified for special education services. Upon continued analysis, it was revealed that 42.6% were classified as transitional bilingual and 18.4% of the students had a migrant status (Office of Superintendent of Public Instruction, 2011).

Participants in the study were selected based upon their participation in three sports, fall, winter 1, and winter 2 or not playing in any school sport. Data was gathered that compared athletes and nonathletes in order to determine if students in athletics had higher grade point averages than students who did not participate in athletics.

Assumptions

The researcher collected data over the course of one semester. Results were compared using different groups of students who had been involved in three sports or did not participate in any sport. The researcher assumed that all students were continuously enrolled at the middle school during the 2011-12 school year. Another assumption was that all students may have been active participants in out-of-building athletic teams. The researcher also assumed that all teachers who taught these students were up-to-date in keeping accurate records of grades.

Hypothesis

Students who participated on three middle school athletic teams had better grade point averages than students who did not participate in any middle school athletic team.

Null Hypothesis

Students who participated on three middle school athletic teams did not have better grade point averages than students who did not participate in any middle school athletic team.

Significance of the Project

The purpose of this project was to determine if athletics made a difference in a student's grade point average. The students at the researcher's school did not show much interest in school sports. The number of participants had been low in the past years. An important outcome was to show that academics and athletics could co-exist, leading to more participation and improved student achievement. If the results showed that athletics potentially made a difference in a student's grades, then the researcher

would have recommended to the school district that a district-wide extra-curricular program was needed to encourage students to be more academically successful.

Procedure

Participants were sorted into two groups: those students who were active on three sports teams and those students who did not participate in any middle school sport. The researcher then gathered GPAs from the first and second quarter from PowerSchool for every student who had been identified. The GPAs were also combined to show semester grades. Students were selected from the eighth grade only. If a student did not participate in three sports he or she was removed from the pool of athletes. The researcher then randomly chose a number of nonathletes to compare with the athletes.

Definition of Terms

fall sport season. This was a sport season starting in August and ending in October.

grade point average. The grade point average earned by a student was figured by dividing the grade points earned by the number of credits attempted.

PowerSchool. Educators used a web-based student information system that enabled parents and students to check grades throughout the school year.

winter 1. This was a sport season starting in October and ending in December.

winter 11. This was a sport season starting in January and ending in February.

Acronyms

AHA. American Heart Association

AYP. Adequate Yearly Progress

BDNF. Brain-Derived Neurotropic Factor

BMI. Body Mass Index

CDC. Center for Disease Control

CDE. California Department of Education

EEG. Electroencephalogram

GPA. Grade Point Average

NFHS. National Federation of State High School

Associations

NYPANS. National Youth Physical Activity and
Nutrition study

OSPI. Office of Superintendent of Public
Instruction

CHAPTER 2

Review of Selected Literature

Introduction

The review of selected literature presented in Chapter 2 was organized to address the following topics: obesity in children, exercise and athletics benefit student learning, and leadership and team building through exercise and athletics. The literature showed that children, adults and the community must work together to develop active lifestyles.

Obesity in Children

The National Institute of Health (2010) had defined overweight as having excess body weight for a particular height from fat, muscle, bone, water, or a combination of these factors and obesity as having excess body fat. The conditions of being overweight and being obese were results of caloric imbalance, more calories consumed than expended.

Immediate and long-term health effects of being obese and overweight were a concern to the Center for

Disease Control (2012). Cardiovascular disease such as high cholesterol or high blood pressure, pre-diabetes, and bone and joint problems, sleep apnea and social and psychological problems were a few immediate health effects youth could encounter. Long term health effects included type 2 diabetes, stroke, several types of cancer, and osteoarthritis. Some of the cancers included breast, colon, endometrium, esophagus, kidney, pancreas, gall bladder, thyroid, ovary, cervix, and prostate, as well as multiple myeloma and Hodgkin's lymphoma (Center for Disease Control, 2012).

Childhood obesity had more than tripled in the past 30 years. Percentages rose from 7% to 20% (children aged 6-11) and 5% to 18% (children aged 12-19) (Center for Disease Control, 2012).

In a 2010 National Youth Physical Activity and Nutrition Study (NYPANS) conducted by the CDC, very disturbing results were found. Among these findings only 12.2% met the Healthy People 2020 objective for both aerobic and muscle strengthening activities. Only

15.3% met the objective for daily aerobic activity. Fewer female students (5.8%) than male students (18.5), and fewer obese (7.3%) than overweight (13.6%) and under/normal weight (13.3%) met the objectives for both aerobic and muscle strengthening activities (National Youth Physical Activity and Nutrition Study, 2010).

According to the American Heart Association (AHA) one in three children and teens were overweight or obese. Childhood obesity became the number one health concern, topping smoking and drug abuse. The AHA had stated that adult health problems such as type 2 diabetes, high blood pressure, and elevated blood cholesterol were being seen in children. Children were also more likely to have low self esteem, negative body images, and depression.

The AHA (2011) did not identify one cause that had led to this problem. Instead, they said it was a combination of three things: lifestyle habits, environment and genetics. Although the three were factors, the real problem was too many calories into

the body with not enough calories burned. Some common causes to this epidemic were: poor nutrition, bigger portions, dinner out, lack of physical activity, too much television, lack of sleep, barriers in the health care system, and marketing of unhealthy foods to youth.

The AHA (2011) research had shown portion sizes had increased over the past 20 years. The average size serving for French fries had changed from 2.9 to 6.9 ounces. A cheeseburger had changed from 333 to 590 calories. Between 1971 and 2000 the average adult had consumed 250-300 more calories which added up to 26-31 pounds in one year. Adolescents ate eight percent more than 30 years ago. Young people saw more than 40,000 advertisements on television with half being food related. Children 8-12 saw more than 50 hours of food advertisements per year. The decrease in physical activity from elementary to high school was also a big factor as students did not participate in physical activity more than five times a week, a trend that continued into adulthood.

School physical activity requirements had dropped over the past few decades. Only 3.8% of elementary, 7.9% of middle schools, and 2.1% of high schools provided daily physical education for an entire year. Another 22% of schools did not require students to take any physical education. In a 2007 study by the AHA (2011), 61% of competitive foods offered in high schools were fried and high in fat. These calorie-dense, nutrition-poor foods accounted for 83% of all foods sold to high school students.

The Office of the Surgeon General (2010) had said that healthy lifestyle habits, including healthy eating and physical activity, could lower the risk of becoming obese and developing related diseases. The CDC (2010) stated that many sectors influenced the dietary and physical activity behaviors and it was the responsibility of families, communities, schools, child care, medical providers, government agencies, the media, and food and beverage industries to provide a safe and supportive environment for the children. Schools played a critical role by establishing

practices and procedures. The schools were also great places to help students learn about healthy choices.

Children aged 7-12 who were overweight had increased risk for developing heart disease by age 25 and developing arteries similar to a 45 year old person. Obesity caused more damage than smoking and excess drinking and was becoming more expensive to the health care system. Treating obesity-related illnesses in the United States had tripled since 1998 from \$78 billion to \$270 billion in 2009 (AHA, 2011). A health Impact Goal for the year 2020, which required 20% improved cardiovascular health for all Americans and 20% reduction in deaths from cardiovascular diseases and strokes, had been proposed by the AHA (2011).

According to the United States Department of Agriculture (2011), children and adolescents should do 60 minutes of physical activity each day. These activities should include moderate to vigorous intensity including muscle strengthening and bone strengthening activities. If children had not been active they should start the exercise program slowly

and build up to a more vigorous level. Children should learn different types of activities and choose the activities that were appropriate and safe for each individual.

Exercise and Athletics Benefit Student Learning

The latest trend of bolstering America's mathematics and science scores to keep up with other countries had led to a drop in other subject areas such as art, music and physical education. Although the mathematics scores had improved slightly, the science scores continued to drop (Trends in International Mathematics and Science Study, 2007). The federal No Child Left Behind act had increased the amount of time spent on core academic courses. About 6% of the high schools in America offered daily gym classes.

John Ratey (2008), a Harvard clinical associate professor of psychiatry, argued that we needed more physical activity, not only for a cure for obesity but also for academic performance. Ratey made sure to note that just exercising would not make children smarter;

activity put the brain in optimal position for them to learn. Ratey explained his findings in his latest book, *Spark: The Revolutionary New Science of Exercise and the Brain*, (2008),

Exercise stimulates our gray matter to produce Miracle-Gro for the brain. That Miracle-Gro is a brain chemical called brain-derived neurotropic factor (BDNF). When we exercise, our working muscles send chemicals into our bloodstream, including a protein known as IGF-1.

Once in the brain, IGF-1 orders the production of more BDNF. The additional BDNF helps new neurons and their connections grow. In addition, levels of other neurotransmitters are increased after a strenuous exercise session.

Dopamine, serotonin, norepinephrine - all of these are elevated after exercise. So having a workout will help focus, calming down, and impulsivity - it's like taking a little bit of Prozac and a little bit of Ritalin. (p.1)

The California Department of Education (CDE, 2005) looked for correlations between fitness scores and test scores. A standard fitness test of aerobic capacity, Body Mass Index (BMI), abdominal strength, trunk strength, upper body strength, and overall flexibility, was used to see which students were fit. The study concluded that students who were fit scored better on academic tests than the students who were unfit. In the second year of the test socio-economic status was included to make sure that could not be a factor. The study concluded that upper-income brackets scored better but fit children still scored better academically than unfit children.

Charles Hillman (University of Illinois @ Urbana-Champlain, 2007), associate professor of kinesiology, was able to duplicate the California findings. Hillman's findings concluded that BMI and aerobic capacity were significantly more influential to academic scores than other fitness factors. Hillman found, by using electroencephalogram (EEG) tests, that the fit children's brains showed more activity in the

prefrontal cortex. This part of the brain controlled the other brain processes.

Hillman, along with Darla Castelli (Castelli, Hillman, Buck, & Erwin, 2007), worked on another study with nine year old children to see if moderate exercise could benefit cognitive function. Studies had been done with adults but not with young children. The researchers had the children perform a series of stimulus-discrimination tests known as flanker tasks, to assess their inhibitory control. The students were given a pre-test after a resting period and then given a posttest after a 20 minute session on a treadmill. The students had a higher rate of accuracy after the walk. The children were able to fight through the noise and distractions better and stay focused on the task at hand. The Hillman study looked at performance in reading, spelling and mathematics. The results showed significant improvement in reading comprehension with slight improvement in spelling and mathematics. The minor improvements to spelling and

mathematics may have been due to the time it took to take all three tests.

The researchers gave recommendations for schools, such as, scheduling outdoor recess as part of the school day, offering formal physical education to include 150 minutes per week at the elementary and 225 at the secondary level, and classroom teachers integrating physical activity into the classroom.

Leadership and Team Building through Exercise and Athletics

After-school youth-based sports programs provided positive youth development (Berlin, Dworkin, Eames, Menconi, & Perkins, 2007). Three components of the programs included: building relationships between youth and peers, youth and adults; knowledge, skills and competencies identified along with the learning methods; and experiences tailored to each individual. Harlem RBI, Tenacity, Snow Sports Outreach Society, Hoops and Leaders Basketball Camp, and First Tee were just a few programs that helped develop leadership and team building among youth in America.

Sports were the hook to get children involved in these programs but the main goal was to teach teamwork and decision-making skills. The programs could only work with specific guidelines and community cooperation. Many programs that were successful had built philosophies around values such as; one community working together as a team, respecting the community and its surroundings, everyone had potential and knowing that playing, growing and learning were fun.

The youth were required to commit to the programs for more than one season or year. The commitment allowed the youth to grow and be able to give back as they became young adults. Programs had opportunities for alumni to come back and share experiences and knowledge.

Researchers had found that participation in one extra-curricular activity throughout the high school years was associated with positive outcomes such as attending college, voting, and volunteering (Berlin et al., 2007). Hansen, Larson, and Dworkin (2003) found

youth in sports activities reported higher rates of self-knowledge, managing emotions, and physical skills. Bartko and Eccles (2003) found that youth who reported being highly involved in sports described being more psychologically resilient or able to bounce back from problems.

Summary

Youth obesity had been observed as a problem that could be eliminated. Lifestyle, environment, and genetics played a large role in the problems associated with obesity and could be changed with knowledge and active roles from schools, health care providers, and families. Students needed to become active for 60 minutes a day including aerobic activity, muscle strengthening, bone strengthening, and flexibility. Schools needed to become active in offering in-school activities and more after-school activities to help with the obesity problem along with stimulating the brain.

Much research had been done on the effects of exercise and the brain. Exercise released chemicals

into the brain that helped students become more alert and ready to learn. The exercise did not make students smarter but gave them the opportunity to use knowledge learned and were more apt to become involved with school and community.

Community organizations partnered with schools to host after-school programs to help youth stay active and make better decisions. The programs helped connect schools with the community, leading to active citizens who participated in their communities in later years.

CHAPTER 3

Methodology and Treatment of Data

Introduction

The purpose of this project was to determine if athletics made a difference in a student's GPA. This experiment compared the GPA of students who participated in three middle school athletic sport teams and the students who did not participate in middle school athletic sport teams. To accomplish this, data was collected from the Powershool system. The researcher used a pre-test and posttest design and compared the two groups.

Methodology

A quantitative research method was utilized for the study. Quantitative research was the collection and analysis of numerical data to describe, explain, predict, or control phenomena of interest as defined in the book, *Educational Research: Competencies for Analysis and Applications*, (Gay, Mills & Airasian, 2009).

Participants

The participants included in the study were eighth grade boys and girls who ranged in age from 13 to 14 years during the 2011-12 school year. Most students were of Hispanic ethnicity as the school was 94.8% Hispanic, 2.7% White, 1.5% Black, .5% Asian/American Indian. There were 53.7% males and 46.3% females and 96.7% were eligible for free or reduced lunch. The two groups included in the study were 20 boys and girls who participated in three middle school sports teams and 20 boys and girls who did not participate in middle school sports. The second group was chosen from a list using every 20th name.

Instruments

The grade point for each participating student was calculated by averaging the numerical value of the grades the student received for each subject. This was done by using Powerschool. In this study a 4.0 scale was implemented, where 4.0 was an A, down to 1.0 as a D. The GPAs were calculated by adding each student's

grade and dividing by the number of students in each group. The averages were then compared using a *t*-test of significance.

Design

A pre-test and posttest experimental design was used to determine whether the students who participated in middle school sports exceeded the grades of the students who did not participate in middle school sports. GPAs were taken during spring 2011 and then again at the end of the first semester of 2011-12. The design was selected as it provided control for most sources of invalidity. Mortality was not a factor as the participants did not withdraw from either group during the study.

Procedure

GPAs of 20 eighth grade boys and girls participating on middle school sport teams were compared to 20 eighth grade boys and girls not participating on middle school sport teams. The GPAs for each of the two groups were taken at the end of the 2010-11 school year and at the end of the second

quarter of the 2011-12 school year. The experimental group was selected from the list of eighth grade athletes who participated in three sport seasons for the school year 2011-12. The control group was selected from a list of eighth grade students who did not participate in middle school sports in the Powerschool system by an outside observer who selected every 20 students until the list had 10 boys and 10 girls. Only 20 athletes had participated in three sport seasons.

The researcher found information about the students from Powerschool. After the first semester of 2011-12, grades were collected using Powerschool and analyzed using the static group comparison.

Treatment of the Data

Treatment and control group GPAs were based on the grades from spring 2011 and semester one of 2011-12. The grades from each group were averaged and compared using the Windows Statpak to accompany *Educational Research: Competencies for Analysis and Applications*, by Gay, Mills, and Airasian (2009). Mean

scores for both groups were analyzed and interpreted, using the *t*-test formula for two independent groups.

Summary

Chapter 3 provided a description of the research methodology used in the study. Participants were taken from a highly Hispanic, low socio-economic Southeastern Washington State middle school. Grades were collected from the Powerschool system, which used a 4.0 grading scale. The grades were used in the pre-test and posttest experimental design as they were taken before the school year and at the end of the semester for comparison.

CHAPTER 4

Analysis of Data

Introduction

The intent of the study was to investigate whether extra-curricular sports programs had an impact on grades, either positive or negative. The middle school in the study had very low test scores and did not make AYP for 9 years. Depending on the results of the study, the researcher would have recommended continued or increased support of athletics for middle school students.

Description of the Environment

The study was conducted at a middle school in a rural town in Southeastern Washington State during the 2011-2012 school year. The total population of the school was 934 students, 53.7% male and 46.3% female. The majority of students 94.8% were Hispanic and 96.7% were eligible for free or reduced lunch.

Hypothesis

Students who participated on three middle school athletic teams had better grade point averages than

students who did not participate in any middle school athletic team.

Null Hypothesis

Students who participated on three middle school athletic teams did not have better grade point averages than students who did not participate in any middle school athletic team.

Results of the Study

The hypothesis and null hypothesis were tested for significance for both the spring and winter using the *t*-test for independent samples. Both group A and B did not make statistically significant gains as determined by a calculated value of *t*. which was 2.021. The spring test had 38 degrees of freedom and a *t*-value of -1.91. The winter test had 38 degrees of freedom and a *t*-value of -1.60. Table 1 illustrated the results for the spring null hypothesis and hypothesis for $p \geq .05, .01, .001$. Table 2 illustrated the results for the winter null hypothesis and hypothesis for $p \geq .05, .01, .001$.

Table 1. Null hypothesis and hypothesis for spring test for significance.

df=38	.05=1.91/2.021	.01=1.91/2.704	.001=1.91/3.551
Null Hypothesis	Accepted	Accepted	Accepted
Hypothesis	Not Supported	Not Supported	Not Supported

Table 2. Null Hypothesis and hypothesis for winter test for significance.

Df=38	.05=1.60/2.021	.01=1.60/2.704	.001=1.60/3.551
Null Hypothesis	Accepted	Accepted	Accepted
Hypothesis	Not Supported	Not Supported	Not Supported

Although the *t*-test scores did not show a significant difference between the treatment and control groups, the raw data in Table 3 and Table 4 illustrated support for the hypothesis. Both groups of students' grades dropped a little over one tenth of a point from spring to winter quarter.

Table 3. GPA scores for spring 2011

Control	GPA	Treatment	GPA
A	2.94	A	3.62
B	3.46	B	3.1
C	2.16	C	3.12
D	3.08	D	3.76
E	3.71	E	3.45
F	1.28	F	2.98
G	1.71	G	3.82
H	2.84	H	3
I	3.28	I	3.95
J	3.95	J	3.76
K	2.16	K	1.9
L	2.42	L	1.04
M	3	M	3.54
N	3.61	N	1.48
O	3.73	O	2.61
P	0.74	P	1.18
Q	2.45	Q	3.61
R	0.9	R	3.67
S	2.54	S	2.94
T	1	T	3.45
Mean	2.47		2.99

Table 4. GPA scores for winter 2012

Control	GPA	Treatment	GPA
A	2.92	A	3.74
B	3.25	B	3.86
C	2.74	C	2.92
D	3.22	D	3.6
E	3.32	E	3.95
F	2.92	F	2.08
G	3	G	3.45
H	2.25	H	3.11
I	2.33	I	3.6
J	4	J	3.71
K	1.92	K	2.93
L	2.33	L	1.55
M	3.61	M	3.82
N	3.8	N	2.85
O	3.46	O	2.73
P	1.21	P	1.1
Q	1.85	Q	3.78
R	1.61	R	3.47
S	2	S	3.46
T	0.66	T	2.88
Mean	2.62		3.12

Findings

The researcher found no support for the hypothesis at $p \geq .05, .01, .001$. Students who participated in three middle school sports did not make more significant gains in GPA than the students not participating in middle school sports. The outside athletic activities of the control group were not

known to the researcher and could have influenced the higher GPA. Descriptive statistics data revealed that the treatment group had a mean GPA one half point higher than the mean GPA of the control group. The data further explained that both groups' mean GPA had dropped by just over one tenth of a point from spring 2011 to winter 2012.

Discussion

The statistics obtained from the analysis of data did not confirm the researcher's belief that athletics would make an impact on student achievement at the Southeastern Washington State middle school. This belief was supported by research that said, "Students who participated in activity programs tended to have higher GPAs, better attendance records, lower dropout rates, and fewer discipline problems" (NFHS, 2002). Further research that helped support the researcher's belief claimed, "Exercise stimulates our gray matter to produce Miracle-Gro for the brain" (Ratey, 2008).

As a result of the project, the researcher wanted to continue the work of getting children involved in

athletics and fitness training. The results were not supported by data in this project but numerous other research had confirmed the results, leading the researcher to continue searching for benefits of exercise.

Summary

As a result of the data, the researcher found no support for the hypothesis at $p \geq .05$, $.01$, $.001$ levels; therefore the null hypothesis was accepted at all levels. Data for this study revealed that students who participated in middle school sports did not make more significant gains than students who did not participate in middle school sports.

CHAPTER 5

Summary, Conclusion and Recommendations

Introduction

Extra-curricular sports at the researcher's school lacked student participation. However, the numbers had increased in the three years between 2009 to 2012. The school had not made AYP for the entire time the researcher had been teaching at the middle school, a period of 9 years (OSPI, 2011). The intent of the study was to investigate whether extra-curricular sports had an impact on academic achievement, either positive or negative.

Summary

The researcher investigated whether being involved with school sponsored athletics would impact the academic achievement of students. Research of other studies proved that, in fact, after school athletics and fitness made a positive difference in academics. The researcher divided students into two groups. The treatment group was made up of students who participated in three athletic sport teams and the

control group was made up of students who did not participate in any athletic sport teams. Using spring 2011 and winter 2012 GPAs, the researcher conducted tests for statistical significance to determine if the students participating in middle school sports made significant improvements to their GPAs compared to the students not participating in middle school sports.

Conclusions

Based on the *t*-tests, the researcher concluded that students who participated in middle school sports did not make more significant gains than students who did not participate in middle school sports. Although the GPAs dropped for both groups, the GPAs of the students who participated in middle school sports were higher than those who did not participate. The GPA results were for both the spring and winter quarters.

Recommendations

In spite of the results of the study, the researcher recommends more continued support of the extra-curricular athletics, as other research conducted supported after-school athletic programs.

The researcher also recommends that community programs work with the school district to help students stay active after school hours. The low amount of students in this study led the researcher to look at a larger number of students to challenge the reliability. Further studies of the importance of physical activities for academic gain could include fitness classes, academic classes using physical activity breaks, and school-wide activity breaks during different times of the day. Finally, replicating other similar studies might strengthen positive results for extra-curricular sports activities.

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