

The Influence of Physical Activity on Academic Performance Among Students-Athletes: A Case in a Secondary Public School

Najihah binti Mohd Amin¹, Mawarni Binti Mohamed², Ani Mazlina Dewi Mohamed³

{ najihahamin98@gmail.com¹, mawarnim@uitm.edu.my², anima107@uitm.edu.my³}

Fakulti Pendidikan, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor Darul Ehsan, MALAYSIA¹, Fakulti Pendidikan, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor Darul Ehsan, MALAYSIA², Fakulti Pendidikan, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor Darul Ehsan, MALAYSIA³

Abstract. It is a common expectation that bookworm students can perform well and contribute more towards enhancement in academic performance instead of physically active student or best known as sport students. Thus, this study seeks to measure the level of physical activity and explore academic achievement, as well as to examine if there is a relationship between physically active students and academic achievement among student-athletes in a public secondary school in Kedah. Survey method was employed using a set of questionnaires. Purposive sampling method was used to gather information from 22 selected students-athletes involving 8 classes from various sports backgrounds. Results indicated that the associations of physical activity and fitness with cognitive function are relatively few but generally showed a positive association between physical activity and cognitive function of students.

Keywords: Physical activity, academic performance, students-athletes, secondary school

1 Introduction

This Word document can be used as a template for papers to be published in EAI Core Proceedings. Follow the text for further instructions on text formatting, tables, figures, citations and references.

Physical activity (PA) and exercise are often used interchangeably. Physical activity is characterized as any actual growth produced by the compression of skeletal muscle and can occur in short bursts of low to high intensity or long stretches of high intensity. lower, depending on the type of operation. Exercise, on the other hand, is a specific structured and repeated form of physical activity, with the goal of improving or maintaining fitness, function or health (Dishman, R. K., et al, 2006). . Physical activity has many benefits both physically and mentally. The World Health Organization (2020) highlights important health benefits for the heart, body

and mind, with exercise improving thinking skills, learning and judgment. Physical inactivity is associated with many health risks, including heart disease, cancer, diabetes, hypertension, as well as anxiety and depression (Kohl & Cook, 2013). People who are sedentary have a 20-30% higher risk of death than those who are fully active (WHO 2020).

Various studies have measured academic performance and physical activity. The association between physical activity and physical activity with cognitive function was relatively small, but overall showed a positive association between physical activity and cognitive functioning of students. Regular exercise and better aerobic fitness are associated with greater brain volume, better neurophysiological responses to stimuli measured by an electroencephalogram (electroencephalogram), and how well of growth factors promote brain tissue growth, neurogenesis, and angiogenesis (Zoeller R.F. 2010). Building on their findings, another study also suggested that students' fitness levels were strongly and significantly associated with academic achievement, regardless of other socioeconomic and status variables. , and seems to be too high from the end of middle school to the beginning of high school. (Trost 2009) and (Rauner, et al 2013) also concluded that, based on their study, aerobic capacity was an important predictor of academic performance. Therefore, this study aimed to examine the relationship between physical activity and academic performance among student-athletes from a school in Malaysia.

1.1 Background of study

Examining the link between physical activity participation and academic performance is important for several reasons. For example, understanding the relationship between sports participation, academic achievement, and cognitive development is important for teachers, school psychologists, and other stakeholders. If student participation in sports is tied to academic achievement and cognitive development, then student-athletes should be encouraged and supported to continue participating in sports rather than being perceived as a distraction. from their participation.

According to Pica R. (2004) and Grissom J.B. (2005), studies have suggested that students who participate in 5 hours of active physical activity per week do better in math, English, and science than students who participate in only 2 hours of physical activity. physical movement. work. operate every week. Research has shown that physical activity and physical activity help children learn more effectively. According to research on the brain of (Jenson, E. 2001), the early learning process of children is based on motor development. He discovered that there is a connection between the cerebellum (the motor part of the brain) and cognitive functions such as memory, spatial orientation, attention, language, and decision-making. Furthermore, Jenson further confirmed that the majority of the brain is activated during physical activity and that sitting for more than ten minutes at a time leads to a decrease in concentration.

(Cocke, A. 2002) reported that regular student participation in various sports activities showed improved attributes such as increased brain function and nutrition, and higher energy/concentration levels. , changes in body composition affect self-esteem, increased self-esteem and better behavior. can all support cognitive function. (Hillman et, all. 2009) also reported that continued physical activity resulted in increased cerebral blood flow, altered hormone levels, increased nutrient intake, and greater stimulation of brain activity. Theo (Jenson, E. 2001) a brain study found a positive and significant correlation between physical activity levels and cognitive (brain) development. Other studies by (Chaddock, L. et all 2011)

and (Pontifex, M.B. et al 2011) found that physically healthy children performed better on memory-related tasks and noticed that healthy children exhibit faster cognitive processing, which suggests that these children have a larger attention span and faster processing of the presented stimulus.

For this study, researchers conducted the study at a Malaysian public high school on a northern peninsula. SMK Mergong School is also known as sports school and is located in the capital Kedah, in Alor Setar district. The researchers focused only on student-athletes. Sample 4 out of 5 classes consisted of only 22 student-athletes. Indeed, not all students of this school are athletes, even though the school is known as a sports school. This study was carried out after the Malaysian government declared the epidemic endemic and reopened schools as normal. Outing restrictions due to the pandemic made this study impossible because the student-athletes did not participate in any physical activity and were focused solely on academics, which were conducted directly. line.

1.2 Statement of problem

Academic performance is a key factor to be considered to secure a place in the higher learning and to get good jobs for future. This has been the focus amongst many including Malaysian parents and students. Thus, generally speaking, only bookworm students are seen to be able to perform well and contribute more toward enhancement in academic performance instead of physically active student or best known as sport students. Furthermore, some of parents think that students' involvement in sports is just a waste of time and energy. This is because some of sports teams require a huge amount of time for practices, games, fundraising and pre-season training on the part of the student athlete, it could be contended that if students are engaged in challenging subjects, they may not have time to maintain excellent grades. These critics claim that students who participate in sports give up all their energy for training and participate in sports activities and have little time and energy to devote to their academic work. This assumption continues to grow and dominate the thinking of today's society.

However, research have found that actively involved in sports is also able to contribute to academic performance. This is proven when (Hillman et al 2009) indicated that consistent physical activity led to increased cerebral blood flow, changes in hormone levels, enhanced nutrient intake and greater arousal in brain functioning. Additionally, (Chaddock, L. et al 2011) found that specific regions of the basal ganglia of the brain, which support cognitive control, are enlarged in physically fit children.

Another studies by (Chaddock, L. et al 2011) and (Pontifex, M.B. et al 2011) revealed that physically fit children performed better on associational memory tasks and found that physically fit children displayed faster cognitive processing speed that indicated that these children had greater attentional ability and faster processing of the stimulus being presented. While another study has demonstrated that children who were physically active showed improvement on fluid intelligence tests (Reed, et al 2010). The following are the research objectives for this study:

- a) To measure the level of physical activity among students- athletes of SMK Mergong.
- b) To explore the academic achievements of students-athletes of SMK Mergong.
- c) To examine if there is a relationship between physically active students and academic achievements among students-athletes of SMK Mergong.

2 Literature Review

2.1 Physical activity and related concept

PAs can be classified in a variety of ways, including type, intensity, and purpose. In terms of "goal" classification, physical activity is often classified according to the context in which it is practiced. Commonly used physical activity classifications include occupational, recreational or recreational, household, personal care, and transportation physical activities (Physical Activity Guidelines Advisory Committee 2008).). Another term encountered in the literature is leisure time physical activity (Physical Activity Guidelines Advisory Committee 2008) and (Cavill, N., et al 2006) defined as activities performed by a person that is not as essential as daily essential activities. life. lived and done for the benefit of man. The term lifestyle activity describes activities a person does in daily life that can contribute to energy expenditure, such as taking the stairs instead of using the elevator, walking instead of driving. , park farther than usual to walk to a location (Physical Performance Advisory Committee 2008) and (Riddoch C. 2005) The terms exercise and physical activity are often used interchangeably.

2.2 The association between physical activity and academic achievement

According to Pica R. (2004) and Grissom J.B. (2005), studies have suggested that students who participate in 5 hours of active physical activity per week do better in math, English, and science than students who participate in only 2 hours of physical activity. physical movement. work. operate every week. Research has shown that physical activity and physical activity help children learn more effectively. Furthermore, Jenson further confirmed that the majority of the brain is activated during physical activity and that sitting for more than ten minutes at a time leads to a decrease in concentration. In addition, Tomporowski, Davis, Miller and Naglieri (2008) determined that sports participation has a positive effect on student academic performance.

Students spend hours in their classrooms and typical lessons are taught in classrooms where students sit and listen to their teachers. Students cannot sit still for long periods of time before blood and oxygen flow to the brain slows down dramatically, hindering the learning process (Gilbert, A.G 2002). This means that active learning and physical activity help students to be more focused and productive. For example, one study found a positive association between physical activity and academic achievement (Chomitz, V.R., et al 2009). Overall, various studies have shown that there is a link between fitness and academic performance, with better performance being associated with higher fitness levels. These studies have also found that physically healthy children do better in class, attend school more consistently, and have fewer discipline problems.

Regular exercise and better aerobic fitness are associated with greater brain volume, better neurophysiological responses to stimuli measured by an electroencephalogram (electroencephalogram), and how well of growth factors promote brain tissue growth, neurogenesis, and angiogenesis (Zoeller R.F. 2010). They recommend that policymakers consider a physical education subject in middle and high schools and increase the time spent on physical education with a focus on promoting cardiovascular health. Van Dusen et al (2011). According to Jenson E. (2001), brain research shows a positive and significant correlation

between levels of physical activity and cognitive (brain) development. Cocke, A (2002) reported that regular participation of students in various sports activities showed improved attributes such as increased brain function and nutrition, higher energy/concentration levels, changes in body composition affect self-esteem, increased self-esteem and better behavior can all support cognitive function.

Another study (Jenson, E. 2001) suggested that early learning is based on motor development. There is a connection between the cerebellum (the motor part of the brain) and cognitive functions such as memory, spatial orientation, attention, language, and decision making. Jensen (2010) has determined that exercise is strongly correlated with neurogenesis, the production of brain cells that are associated with improved learning and memory.

Another study (Shepherd, R.J., 1997; Hillman, C.H., 2009) also showed that continued physical activity leads to increased cerebral blood flow, changes in hormone levels, increased nutrient intake, and brain function. more excited. In addition, Chaddock, L. (2010) found that specific regions of the brain's basal ganglia, which support cognitive control, are enlarged in physically fit children. In addition, physically healthy children demonstrate superior performance in behavioral activities that require complex skill and control. Other studies show that physically healthy children perform better on associative memory tasks, and physically healthy children show faster cognitive processing speeds (Chaddock L., 2010 ; Pontifex M.B., 2011).

3 Material and Methodology

3.1 Method

Purposive sampling technique was used to gather the data from the respondents. There were 22 selected students-athletes from various backgrounds and sports specializations. Form 4 students-athletes were selected because they have experiences in sports participation and trainings when they were in Form 2 before the pandemic. Students who are also school athletes were given 7 questions to answer with regards to their level of physical activity involvements from the scales of Never, Sometimes, and Frequent. Then in the next Section they were asked to give their perceptions on academic performance and physical activity involvement. There were 9 questions, and the response was either Disagree or Agree. Finally, to validate their opinion, their actual Tests results were also analysed. Their academic performances were recorded through their results in two different tests in the early academic calendar and mid school year. Chi-square was employed to compare observed results with the expected results of their tests. The purpose of this test is to determine if there was a difference between the first test and the second test in several subjects taken by the students. As athletes, their activities in various sports specializations were still carried out in between the two tests throughout the year.

4 Results and Discussion

4.1 Demographic data

In the first section A: Demographic information consisted of 4 questions which are (1) gender, (2) form or class, (3) sport, and (4) achievement or level.

Table 1 Demographic Data

Gender	Frequency	Percentage (%)
Male	15	68.2
Female	7	31.8
Total	22	100

Form / Class	Frequency	Percentage (%)
4 Inovatif	7	31.8
4 Kreatif	6	27.3
4 Amal 1	2	9.1
4 Amal 2	6	27.3
4 Amal 4	1	4.5
Total	22	100

Sport	Frequency	Percentage (%)
Football	15	68.2
Hockey	2	9.1
Netball	2	9.1
Tenpin Bowling	1	4.5
Track & Field	2	9.1
Total	22	100

Achievement / Level	Frequency	Percentage (%)
School (MSSD)	4	18.2
District (MSSK)	11	50.0
State (MSSM)	1	4.5
National	6	27.3
Total	22	100

Table 1 showed the demographic data in this study. Table shows that 15 male students-athletes and 7 female students-athletes were involved. The percentage for gender is 68.2 percent for male and 31.8 percent represent for female. This indicates that the number of male students-athletes who engage in sport much higher compared to female students-athletes.

The table displays students- athletes' respective classes. There is a student-athlete representative from class 4 Amal 4 whose percentage shows a reading of 4.5 percent. In addition, as many as 91.7 percent which is a total of 2 students-athlete representatives from class 4 Amal 1. Meanwhile, the total participation of student-athletes for both classes 4 Kreatif and 4 Amal 2 is the same, which is a total of 6 people, and the percentage is 27.3 percent. While Class 4 Inovatif showed the highest percentage of 31.8 percent with a total of 7 student athletes involved from that class.

In addition, the table also shows that there are 5 types of sports that student-athletes engaged in. Football showed a higher participation percentage with 68.2 percent with a total of 15 athletes. While the three sports of hockey, netball, and track and field all have the same number of participants which is two for each sport and are each represented by 9.1 percent. Lastly, tenpin bowling, which has just one student-athlete, has the lowest proportion 4.5 percent in overall.

In the achievement column, the table shows there are 4 levels of achievement that student-athletes successfully qualified in the field of sports. As stated in the table above, the district level (MSSK) recorded half of the total number or the highest number with the achievement of 11 people or as much as 50.0 percent. Meanwhile, the second highest level is the national level with a percentage of 27.3 percent which is the involvement of 6 people. Next, the school level (MSSD) also recorded a reading of 18.2 percent, or a total of 4 student-athletes. Lastly, the lowest qualifying percentage reading of 4.5 percent was at the state level (MSSM), where only one athlete competed.

4.2 The level of student-athletes participation in physical activity.

Table 2 Student-athletes physical activity involvements

Questions			Frequency	Percentage
1.	During the last 7 days, did you walk for at least 10 minutes at a time?	Frequent	22	100.0
2.	Are you active in a sport at school?	Frequent	22	100.0
3.	Have you been chosen to represent the school at events?	Sometimes	1	4.5
		Frequent	21	95.5
4.	Do you attend the school's organised sports training?	Frequent	22	100.0
5.	Do you do additional training outside of the school?	Sometimes	5	22.7
		Frequent	17	77.3
6.	During the last 7 days, did you do vigorous physical activity like heavy lifting, digging, aerobics or fast bicycling?	Sometimes	8	36.4
		Frequent	14	63.6
7.	Have you ever donated a medal to a school or team during your participation in sports?	Sometimes	7	31.8
		Frequent	15	68.2

In terms of level of involvement, students-athletes were asked to state how often they walked for 10 minutes at least in the past 7 days and the questions were structured and scaled (never, sometimes, and often). Table 4.2.1 revealed that 100 percent of the students-athletes are frequently walked in their past 7 days ago. This means that most of the students-athletes are actively walking whether they are walking to school, doing training sessions or moving anywhere.

Further analysis was conducted to verify how active students-athletes get themselves involved in sport at school. According to the table above, a total of 22 which means 100 percent student-athletes claimed that they are regularly active in sports at school.

A study topic was posed to determine the frequency of student athletes' selection to ensure their degree of participation in a sporting event. Results showed that majority (95.5%) stated that they were frequently chosen to represent the school in athletic competitions and only 1 person or 4.5 percent student-athletes claimed sometimes.

Based on question no 4, it is revealed that all 100 percent (22) student-athletes who responded to the survey said they frequently participated in school athletic training. The data above inferred

that student athletes commit a significant amount of time to their sports practises. To have more comprehensive information on the extent to which student-athletes do extra training outside of school apart from attending sports training organized by the school, the fifth question displays the results of the survey.

A study topic was posed to know how often student-athletes get extra training other than doing training at school. Table above indicates that 22.7 percent of the 5 student-athletes occasionally participate in outdoor training. While 77.3 percent (17 student athletes) choose to do training outside of school as their additional training. This means all student athletes choose to participate in school training sessions over additional training sessions outside of the institution.

According to the survey that has been done, not all student-athletes do vigorous activities. This is revealed through the table above where 14 students-athletes or 63.3 percent admit that they ‘frequently’ do vigorous activities as asked in the question. While only 8 people or 36.4 percent claimed that they only ‘sometimes’ engaged in vigorous activities such as weightlifting, digging, aerobics or fast cycling. This is because each students-athlete has a different sports background which shaped the type of training sessions, which vary for each sport. The training capacity also depends on the type of sport and position that the student-athletes engaged in.

For the last question, a total of 15 students-athletes claimed to ‘frequently’ donate medals to the school. While the remaining 7 student-athletes responded "sometimes" to answer questions about donating medals to schools or teams during their involvement in sports. In general, student-athletes were significantly active in school and after school due to their roles as sport representatives.

4.3 The students-athletes academic performance and physical activity.

Table 3 Students-athletes’ opinions on academic performance and physical activity.

Questions			Frequency	Percentage
1.	Do you agree that involvement in sports affect your academic time management?	Disagree	20	90.9
		Agree	2	9.1
2.	Do you agree that your involvement in sports affect your academic performance?	Disagree	15	68.2
		Agree	7	31.8
3.	Self-involvements in sport makes students sleepy and tired in class due to intensive training programs.	Disagree	21	95.5
		Agree	1	4.5
4.	Involvement in sports makes students easily lose focus while studying.	Disagree	21	95.5
		Agree	1	4.5
5.	My involvement in sports made me less discipline in managing my studies and sports.	Disagree	22	100
		Agree	-	-
6.	My involvement in sports made me unable to commit in my studies.	Disagree	22	100
		Agree	-	-
7.	What is your current examination result?	Poor	3	13.6
		Average	17	77.3
		Good	2	9.1

8. Do you fail in any subject?	Yes	21	95.5
	No	1	4.5
9. I think that sports can guarantee a brighter future than education.	Disagree	12	54.5
	Agree	10	45.5

In this section, respondents were asked about their perception of academic achievement and physical activity. A total of 9 questions were structured and have fixed answers to be answered according to everyone's self-perception. The percentage of each question included in the research question is listed in table 4.3.1 above. For the first question, 90.9 percent or 20 student-athletes stated that they did not agree that involvement in sports affected their academic time management compared to 9.1 percent or only 2 people who agreed.

The highest response rate on the second question was 68.2 percent (15 student-athletes), who also said they disagreed with the statement that participation in sports impairs academic achievement. While 31.8 percent or 7 people agreed with the question.

Next, for the third question, almost all of them, 21 student-athletes or 95.5 percent disagreed. Meanwhile, only one person and represented by a percentage of 4.5 percent agreed that self-involvement in sports causes students to become sleepy and fatigue in class due to the intensive training program.

For the next question, the percentage of athletes who agreed was low, only one with a percentage of 4.5 percent. This indicates that a total of 21 student-athletes, or 95.5 percent, 'disagreed' with the claim that participating in sports makes students more prone to get distracted while studying. If you look closely, the percentages for both questions 3 and 4 have the same % value, indicating that majority student-athletes 'disagreed' that participating in sports made students sleepy, fatigued, and prone to losing focus when studying.

Referring on table above, with regards to disciplinary problems in the management of lessons and sports. 22 athletes, or 100% of the athletes, 'disagreed' that participating in sports leads them to be less disciplined in juggling their schoolwork and sports. Furthermore, self-involvement in the world of sports prevents student-athletes from committing to their studies, a statement that received 100% of the respondents "disagree" response choice. As a result, no athlete agrees on the issue. For questions 5 and 6, the percentage of answers for both questions is the same.

Question 7 asks about their exam results. 3 respondents with a percentage of 13.6 choosing 'less satisfactory/poor'. Regarding their most recent exam results, an average of 17 respondents, or 77.3 percent, selected the 'moderate/average' level, while the remaining 2 individuals rated their most current exam results as 'good'. Obviously, it is evident from the table above that, with a total proportion of 95.5 percent or 21 respondents, nearly all respondents acknowledged that they had failures in the subject. While only one person, 4.5 percent, did not have a failed status in any subjects.

Lastly, 45.5 percent of the 10 respondents agreed that athletics can ensure a better future than education. Meanwhile, 12 respondents, or 54.5 percent, voted not to agree to the statement. This indicates that student-athletes believed their active involvement in sports gave some benefits and recognitions, and bring about a different perceptions with regards to academic achievement alone as a promising future for students.

4.4 Findings

Table 4 Chi-Square Test results

Chi-Square Tests				
	Value	df	Asymp. Sig. (2-sided)	
Pearson Chi-Square	145.667 ^a	117	.037	
Likelihood Ratio	73.752	117	.999	
Linear-by-Linear Association	14.934	1	.000	
N of Valid Cases	19			

a. 140 cells (100.0%) have expected count less than 5. The minimum expected count is .05.

Results from table 4.4.1 shows that, the value of Chi-Square statistic for Mathematics subject is 145.667. The p-value is .037 (<.05) which mean less than designated alpha level (normally .05). This mean null hypothesis is rejected and alternative hypothesis is accepted. In other words, that there is a significant relationship between physical activity toward academic performance among students-athletes.

Table 5 Chi-Square Test results on subjects

Chi-Square Test

Subject		Value	df	Asymptotic Significance (2-sided)
Mathematic	Pearson Chi-Square	145.667 ^a	117	.037
	Likehood Ratio	73.753	117	.999
	Linear-by-Linear Association	14.934	1	.000
	N of valid cases	19		
Bahasa Melayu	Pearson Chi-Square	202.650 ^a	176	.082
	Likehood Ratio	90.274	176	1.000
	Linear-by-Linear Association	18.990	1	.000
	N of valid cases	21		
English	Pearson Chi-Square	190.000 ^a	192	.527
	Likehood Ratio	88.661	192	1.000
	Linear-by-Linear Association	17.117	1	.000
	N of valid cases	19		
Sejarah	Pearson Chi-Square	114.183 ^a	104	.232
	Likehood Ratio	59.780	104	1.000
	Linear-by-Linear Association	12.892	1	.000
	N of valid cases	17		
Pendidikan Islam	Pearson Chi-Square	232.750 ^a	208	.115
	Likehood Ratio	94.207	208	1.000
	Linear-by-Linear Association	17.193	1	.000
	N of valid cases	19		
Science	Pearson Chi-Square	196.000 ^a	180	.196

Likelihood Ratio	92.506	180	1.000
Linear-by-Linear	19.062	1	.000
Association	21		
N of valid cases			

Results from table 4.4.2 show that the value of Chi-Square statistic for Mathematics subject is 145.667. The p-value is .037 (<.05) which mean less than designated alpha level (normally .05). This mean that there is a significant relationship between physical activity toward academic performance among students-athletes on Mathematics subjects though the results of the other subjects shown an increment.

5 Discussion

Student-athletes in the school where the research was carried out are highly active students. Their involvement in physical activities is not only during sports, training, and Physical Education classes but also in their daily lives. Whether their participation is in organized or unorganized activities, they understood the importance of being active for health benefits. Student-athletes understood the roles of PA and sports in maintaining good health. Furthermore, they believed that involvement in sports did not give negative influence towards academic achievements. This is consistent with previous research which shown that physical movement and physical activity assists children, youth and adults in learning and functioning more effectively towards daily routines. Involvement in organized sports activities aid in functional movement skills and strength; and academic, self-regulatory, and general life skills.

Their perceptions towards academic achievement also indicated the benefits they gained from being physically active. PA and sports made them more disciplined, and they understood the importance of academic achievement goes hand in hand with being excellent in sports. Many studies suggested that students participating in vigorous physical activity had stronger academic performances (Pica R., 2004; Grissom J.B., 2005); Tomporowski, Davis, Miller, & Naglieri, 2008) identified that engagement in sports have positive influence on students' academic performance.

Finally, to further investigate the claim regarding their opinions regarding their academic performance with being physically active, results of this study showed a relationship between physical activity toward academic achievement, in mathematics subject. This is consistent with previous studies by Broh (2002) who identified good results in English and mathematics for students who engaged in sports. From a previous study conducted by Ingegerd (2006) results indicated that, for boys, extended physical activity and additional motor motor training in school had better results in all measured parts of the national mathematics tests. This is relevant with this study as the respondents are 68.2 percent or 15 are male athletes. According to data provided by the school, there was an increase in other subjects as well but not as significant as in Mathematics subject. This is true as sports helps young athletes learn important life skills like goal setting and time management. Statistics have also shown that student-athletes can get better jobs and higher incomes after graduating and also scored higher in tests than those who are not active.

6 Conclusion

The study's interpretation shows that most of the respondents are actively practicing sports at school. While not robust, these findings are consistent with previous studies that have shown a link between physical activity and academic performance. Although students spend a lot of time participating in sports, they still have time to learn. Table 4.4.1 demonstrates that math had a positive effect at the end of the study. According to data from the school, he also noted an increase in the number of successful students. Based on these results, student-athletes should not be discouraged from playing sport in the false belief that it will harm their academic success. Parents, teachers and school administrators should encourage gifted and talented students to play sports. This is in line with Malaysia's national educational goal of producing well-rounded students not only academically but also intellectually, mentally, emotionally and physically.

References

- [1] Broh, B. A. (2002). Linking extracurricular programming to academic achievement: Who benefits and why? *Sociology of education*, 75, 69-95.
- [2] Cavill, N., et al. (2006). An evidence-based approach to physical activity promotion and policy development in Europe: contrasting case studies. *Promot Educ*; 13 (2): 104–11.
- [3] Chaddock, L., Erickson, K. L., Prakash, R. S., Van Patter, M., Voss, M. W., Pontifex, M. B, Kramer, A. F. (2010). Basal ganglia volume is associated with aerobic fitness in preadolescent children. *Developmental Neuroscience*, 32 (3), 249-256.
- [4] Chomitz, V. R., Slining, M. M., McGowan, R. T., Mitchell, S. E., Dawson, G. F., & Hacker, (2009). Is there a relationship between physical fitness and academic achievement? Positive results from public school children in Northeastern United States. *Journal of School Health*, 79, 30-37.
- [5] Dishman, R. K., Berthoud, H.-R., Booth, F. W., Cotman, C. W., Edgerton, R., & Fleshner, M. R., et al (2006). *Neurobiology of exercise*. *Obesity*, 14(3), 345–356.
- [6] Emmanuel Agyel, Christopher Yarkwah (2020). Effects of sport participation on the academic performance of senior high school students in mathematic; *Global Journal of Art, Humanities and Social Sciences*. Vol. 8 No. 2.
- [7] Getu Teferi (2020). The Effect of Physical Activity on Academic Performance and Mental Health: Systematic Review; *American Journal of Science, Engineering and Technology*. Vol 5, No 3.
- [8] Hillman, C. H., Buck, S. M., Themanson, J. R., Pontifex, M. B., & Castelli, D. M. (2009). Aerobic fitness and cognitive development: Event-related brain potential and task performance indices of executive control in preadolescent children. *Development Psychology*, 45 (1), 114-129.
- [9] Ingegerd Ericsson (2006). Motor skills, attention and academic achievements. An intervention study in school years 1-3; *British Educational Research Journal*. Vol. 34, No. 3.
- [10] Pontifex, M. B., Raine, L. B., Johnson, C. R., Chaddock, L., Voss, M. W., Cohen, N. J., et al. (2011). Cardiorespiratory fitness and the flexible modulation of cognitive control in preadolescent children. *Journal of Cognitive Neuroscience*, 23 (6), 1332-1345.
- [11] Rauner, R. R, Walters, R. W., Avery, M., & Wanser, T. J. (2013). Evidence that aerobic fitness is more salient than weight status in predicting standardized math and reading scores in fourth through eighth grade students. *Journal of Pediatrics*, Aug (163), 2, 344-348.
- [12] Reed, J. A., Einstein, G., Hahn, E., Hooker, S. P., Gross, V. P., & Kravtiz, J. (2010). Examining the impact of integrating physical activity on fluid intelligence and academic performance in an

elementary a school setting: A preliminary investigation. *Journal of Physical Activity and Health*, 7 (3), 343-351.

[13] Shepherd, R. J. (1997). Curricular physical activity and academic performance. *Pediatric Exercise Science*. 9, 113-125.

[14] Tomporowski Phillip D., Davis Catherine L., Miller Patricia H. and Naglieri Jack A (2008). Exercise and Children's Intelligence, Cognition and Academic Achievement; *Educational Psychology review*, 20(2), 111-131.

[15] Van Dusen, D. P., Kelder, S. S., Kohl, H. W., 3rd, Ranjit, N., & Perry, C. L. (2011). "Associations of physical fitness and academic performance among school children." *Journal of School Health*, 81 (12), 733-40.

[16] Zoeller, R. F. (2010). Can working out train the brain too? *American Journal of Lifestyle Medicine*, vol. 4. (no. 5), 397-409.

[17] Physical Activity Guidelines Advisory Committee. (2008). *Physical Activity Guidelines Advisory Committee Report 2008*. Washington, DC: U.S: Department of Health and Human Services

[18] Catherine L. Davis. Norman K. Pollock (2021) Does Physical Activity Enhance Cognition and Achievement in Children? A Review: Medscape Education Diabetes and Endocrinology retrieved from <https://www.medscape.org/viewarticle/764365>

[19] Cocke, A (2002). Brain may also pump up from workout. Retrieved from <http://www.neurosurgery.medsch.ucla.edu>.

[20] Gilbert, A. G. (2002). Movement is the key to learning. Retrieved from <http://www.newhorizons.org>.

[21] Grissom, J. B. (February 2005). Physical fitness and academic achievement. *Journal of Exercise Physiology*, vol. 8, Retrieved from <http://www.asep.org/jeponline/issue/Doc/Feb2005/Grissom.pdf>.

[22] Jensen, E. (2001). Moving with the brain in mind. *Educational Leadership*, (3), pg. 34-37. Jensen, E. (2010, April 19). Physical Education Is Supported by Brain Research. *Physical Education Is Supported by Brain Research | Brain Based Learning | Brain Based Teaching | Articles from Jensen Learning*. Retrieved from <http://www.jensenlearning.com/news/physical-educationis-supported-by-brain-research-or-brain-based-learning>.

[23] Pica, R. (2004a). More movement, smarter kids. Retrieved from <http://www.movingandlearning.com>.

[24] Trost, (2009). Active education: physical education, physical activity and academic performance. A research brief. *Active Living Research*, a National Program of the Robert Wood Johnson Foundation, (Summer). Retrieved from https://activelivingresearch.org/sites/activelivingresearch.org/files/ALR_Brief_ActiveEducation_Summer2009.pdf

[25] World Health Organization (2020) Physical Activity retrieved from <https://www.who.int/news-room/fact-sheets/detail/physical-activity>