

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

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**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.

**Key words:** physical activity ; academic performance ; students-athletes ; secondary school

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## INTRODUCTION

Physical activity (PA) and exercise are often used interchangeably. Physical activity is characterized as any real development created by the compression of skeletal muscles and can occur in short bursts of low to high intensity or long, sustained periods of lower intensity, depending on the types of activities. Exercise, on the other hand is a specific form of physical activity that is structured and repetitive, with the goal of improving or maintaining physical fitness, function, or health (Dishman, R. K., *et all*, 2006). Physical activity brings numerous benefits in both physically and mental. World Health Organization (2020) emphasises on the significant health benefits for the for hearts, bodies and minds in which exercise helps to enhance thinking, learning, and judgment skills. Physical inactivity is associated with numerous health risks, including heart disease, cancer, diabetes, hypertension, as well as anxiety and depression (Kohl & Cook, 2013). People who are insufficiently active have a 20% to 30% increased risk of death compared to people who are sufficiently active (WHO 2020).

There was various research that measure academic performances and physical activities. The associations of physical activity and fitness with cognitive function are relatively few but generally show a positive association between physical activity and cognitive function of students. Involving in regular exercise and on more aerobic fitness are related to greater brain volume, improved neurophysiological responses to stimuli as measured by EEG (electroencephalography), and better levels of growth factors that promote growth of brain tissue, neurogenesis, and angiogenesis (Zoeller R.F. 2010). Another study also suggested from their finding that physical fitness levels of students were strongly and significantly related to academic achievement regardless of other socio-demographic and physical fitness variables and seems too high in late middle to early high school. (Trost 2009) and (Rauner, *et all* 2013) also conclude that from their study aerobic fitness was a significant predictor of academic performance. Thus, this study aims to see the relationship between physical activity involvements and academic performances among students-athletes in a school in Malaysia.

## 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.

## RESULT AND DISCUSSION

### 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 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.

**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

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.

**The level of student-athletes participation in physical activity**

**Table 2.** Student-athletes physical activity involvements

Questions		Frequency	Percentage
During the last 7 days, did you walk for at least 10 minutes at a time?	Frequent	22	100.0
Are you active in a sport at school?	Frequent	22	100.0
Have you been chosen to represent the school at events?	Sometimes	1	4.5
	Frequent	21	95.5
Do you attend the school’s organised sports training?	Frequent	22	100.0
Do you do additional training outside of the school?	Sometimes	5	22.7
	Frequent	17	77.3
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
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 2 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.

### The students-athletes academic performance and physical activity

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

Questions		Frequency	Percentage
Do you agree that involvement in sports affect your academic time management?	Disagree	20	90.9
	Agree	2	9.1
Do you agree that your involvement in sports affect your academic performance?	Disagree	15	68.2
	Agree	7	31.8
Self-involvements in sport makes students sleepy and tired in class due to intensive training programs.	Disagree	21	95.5
	Agree	1	4.5
Involvement in sports makes students easily lose focus while studying.	Disagree	21	95.5
	Agree	1	4.5
My involvement in sports made me less discipline in managing my studies and sports.	Disagree	22	100
	Agree	-	-
My involvement in sports made me unable to commit in my studies.	Disagree	22	100
	Agree	-	-
What is your current examination result?	Poor	3	13.6
	Average	17	77.3
	Good	2	9.1
Do you fail in any subject?	Yes	21	95.5
	No	1	4.5
I think that sports can guarantee a brighter future that 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 3 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.

**RESULTS AND DISCUSSION**

Results from table 4 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 4.** Chi-Square Test results

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	145.667 <sup>a</sup>	17	.037
Likelihood Ratio	73.752	17	.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.

**Chi-Square Test**

Results from table 5 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.

**Table 5.** Chi-Square Test results on subjects

Subject		Value	df	Asymptotic Significance (2-sided)
Mathematic	Pearson Chi-Square	145.667 <sup>a</sup>	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 <sup>a</sup>	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 <sup>a</sup>	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 <sup>a</sup>	104	.232
	Likelihood 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 <sup>a</sup>	208	.115
	Likelihood 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 <sup>a</sup>	180	.196
	Likelihood Ratio	92.506	180	1.000
	Linear-by-Linear Association	19.062	1	.000
	N of valid cases	21		

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 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.

## CONCLUSION

Based on the interpretation of study reveal that most of respondents are actively engage in sport at school. Although not robust, these finding are in line with previous studies suggesting a link between physical activity and academic achievement. Although students may spend substantial amount of time in partaking in sporting activities, they still get time to learn. Table 4.4.1 demonstrates that mathematics subjects had a beneficial influence at the conclusion of the study. According to school data, it also noted an increase in the number of students passing. Based on these results, student athletes shouldn't be discouraged from playing sports under the mistaken belief that doing so will harm their academic achievement. Parents, teachers, and school administrators should encourage students who have the talent and ability to play sports. This coincides with Malaysia's national education goal, to create well balanced students not only academically but also intellectually, spiritually, emotionally and physically,

## REFERENCES

- Broh, B. A. (2002). Linking extracurricular programming to academic achievement: Who benefits and why? *Sociology of education*, 75, 69-95.
- 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.
- 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.
- 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.
- 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.
- Emmanuel Agyel, Christopher Yarkwah (2020). Effects of sport participation on the academic performance of senior high school students in mathematics; *Global Journal of Art, Humanities and Social Sciences. Vol. 8 No. 2*.
- 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*.
- 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.
- 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*.
- 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.
- 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.
- Reed, J. A., Einstein, G., Hahn, E., Hooker, S. P., Gross, V. P., & Kravtitz, 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.
- Shepherd, R. J. (1997). Curricular physical activity and academic performance. *Pediatric Exercise Science*. 9, 113-125.
- Tomprowski 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.
- 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.
- Zoeller, R. F. (2010). Can working out train the brain too? *American Journal of Lifestyle Medicine*, vol. 4. (no. 5), 397-409.
- Physical Activity Guidelines Advisory Committee. (2008). Physical Activity Guidelines Advisory Committee Report 2008. Washington, DC: U.S: Department of Health and Human Services
- 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>
- Cocke, A (2002). Brain may also pump up from workout. Retrieved from <http://www.neurosurgery.medsch.ucla.edu>.
- Gilbert, A. G. (2002). Movement is the key to learning. Retrieved from <http://www.newhorizons.org>.
- 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>.
- Jenson, 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>.

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

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](https://activelivingresearch.org/sites/activelivingresearch.org/files/ALR_Brief_ActiveEducation_Summer2009.pdf)

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