

EFFECTS OF SPORTS PARTICIPATION ON THE ACADEMIC PERFORMANCE OF SENIOR HIGH SCHOOL STUDENTS IN MATHEMATICS

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ABSTRACT: *The primary purpose of this study was to investigate the effect of engaging in sporting activities on the academic performance of students in mathematics at the senior high school level in the Cape Coast Metropolis. To ascertain the main objective of the study, descriptive survey design was employed. The study used 100 senior high school students comprising 59 student-athletes and 41 non-student athletes. For data collection, each respondent was presented with the research questionnaire designed for the study. The study revealed that, there is no statistically significant difference between the performance of student-athletes and non-student athletes in mathematics. The study, however, concluded that, sports participation has no negative effects on students-athletes' academic performance in mathematics. What this finding implies is that, parents and mathematics teachers should not seize students from participating in sporting activities with the fear that participating in sports worsens academic performance.*

KEYWORDS: effects, sports participation, academic performance, learning time

INTRODUCTION AND STATEMENT OF THE PROBLEM

Sports and its associated competitions across the globe have made participation in sports appealing to several others in various parts of the world. It is asserted that, inside a healthy body is a sound mind. Choi, Johnson and Kim (2014) emphasized that sporting activities is a key factor in promoting healthy lifestyles among students who engage in sporting activities. Through sports, students learn social and cognitive skills. A student who partakes in sporting activities is believed to have a sound mind and thus, the likelihood for him or her to excel in his or her academics is very high. Generally, Bailey, Hillman, Arent, and Petitpas (2013) also

identified that students' participation in sports is associated with a cluster of benefits including: social, mental and cognitive wellbeing, and academic performance.

However, there is a growing body of people who hold on to an assertion that students who engage in sports activities do not perform well academically hence yielding a debate among researchers on the effects of students' engagement in sports and academic performance. This debate has been an issue of contention between several researchers over the previous decades. Some studies (See for example; Tomporowski, Davis, Miller, & Naglieri, 2008; Trudeau, & Shephard, 2008; DeMeulenaere, 2010) identified that engagement in sports have positive influence on students' academic performance. Tremblay, Inman and Williams (2000) revealed that partaking in sports have negative effects on students' academic performance. To identify the effect of sports participation in Canada, Tremblay et al. (2000) discovered that a negative relationship existed between sports participation and standardized test scores among students. It was espoused by Davis and Cooper (2011) that people who partake in sporting activities in schools argue that there exist no positive effects of sports on academic performance. Thorlindson and Bernburg (2006) observed that some parents associate sports with some ill-mannered behaviours. People who question the place of sports in educational institutions, claim that sports participation results in poor performance by sportsmen and sportswomen. These critics claim that students who participate in sports relinquish all their energies into training and partaking in sporting activities and have less time and energy to dedicate to their academic work. Hartman (2008) asserted that "too much periods and energy emphasized on sports shifted focus from academic work of schools". Hartman investigated quite a number of researches done to ascertain the kind of relationship that exists between athletic participation and students' academic achievements. He found out that, most works done in this field claimed students lose their motivation to pursue academic excellence when they get deeply engrossed in sporting activities. On the contrary, Nelson and Gordon-Larsen (2006) discovered that students who engage in sports perform well in science subjects. In a similar vein, Broh (2002) also identified good results in English and mathematics for students who engage in sports.

Since school 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. Nonetheless, Denault, Poulin and Pederson (2009), undertook a five-year longitudinal study of students from grades 7 to 11, using interviews via telephones, questionnaires, and an analysis of academic records, and discovered that student athletes generally had enhanced potential to improve their academic knowledge and expertise, and also to develop their interpersonal relationships. In addition, Fredericks (2012) conducted a two-year study focused on the participation of 10th graders in school-based activities, in which surveys and transcripts showed

that the amount of time spent in sporting activities was favourably related to academic performance. Likewise, 400 athletes were studied by Jonker, Elferink-Gemser, and Visscher (2009). These athletes who were enrolled in either pre-professional or pre-university schools were aged between 14 and 16. The results reported that, a high correlation existed between students' involvement in athletics and academic performance in reading.

In Ghana, sports form an integral part of the various activities carried out in all schools at all levels in the academic year. This is evident as a result of the various sporting competitions organized for schools at all levels of education across the country. For instance, the inclusion of interschools athletics competitions and soccer competitions on schools' academic calendar shows that the Ghana Education Service also believes sports to be beneficial to the students. In every year, athletics and football competitions are organized for students in basic schools, high schools and tertiary institutions in collaboration with the National Sports Council under the Ministry of Youth and Sports. In high schools, interschool's athletics competitions are one of the hallmarks of high school life. It is a time on the school calendar where both teachers and students become actively involved in sports and there is general euphoria among students both on school campus and outside their campuses.

Learning can be observed differently and is often measured and evaluated through cognitive and academic tests. A vast array of student achievements has been associated with participation in a physical activity. The current curriculum approved by Ghana Education Service for use in the Senior High School makes four subjects compulsory for all high school students regardless of the programmes one is offering. Mathematics is one of the core subjects in Ghana, for a student to advance to the next phase of his or her education, it is required of him or her to do significantly well in core mathematics (which is a compulsory subject for all students at the high school level). The issue of students' performance in mathematics is very paramount to mathematics educators. Irrespective of the various research studies that have been conducted across the globe to ascertain the impact of sports participation on students' academic performance, a few of such studies have been conducted in Ghana and also none of the studies conducted in the country has looked at the effect of sports participation on students' academic performance in mathematics at the Senior High School level. It is against this backdrop that this study sought to examine the effects of sport participation on the academic performance of students in mathematics.

Research Questions and Hypothesis

The following research questions were used to guide the study:

1. To what extent do sports participation affect students' performance in mathematics?
2. To what extent does participation in sports affect students' learning time?

To ascertain the effect of sports participation on students' academic performance in mathematics the research hypothesis below was also formulated:

1. H_0 : There is no statistically significant difference between the performance of students who participate in sports and their counterparts who do not.

Design and Instrumentation

This research focused on the effects of sports participation on academic performance of students in mathematics in the Cape Coast Metropolis. The study employed the descriptive survey design to collect data from senior high school students in the Cape Coast Metropolis using a questionnaire. Cape Coast Metropolis was selected for the study because it is considered as the citadel of education in Ghana. Most of the country's best second cycle institutions are situated in the Metropolis. This design was resorted to because according to Cresswell (2012) it is one design in which the investigator administers a survey to a sample or to the entire population of people to describe the attitudes, opinions, behaviours, or characteristics of the subjects involved. Descriptive survey design enjoys the strength of explaining educational phenomena in terms of the conditions or relationships that exist, opinions that are held by students, teachers, parents and experts (Cresswell, 2012). The data used for analysis in this study was acquired through the use of a questionnaire. A four-point Likert scale questionnaire was used to illicit responses from students concerning the effect of sports participation on their academic performance in mathematics. For this reason, close-ended and open-ended questions were designed to solicit the desired answers from the participants. The open-ended questions gave students the opportunity to give out their own answers in written form concerning the phenomenon whereas the close-ended questions gave them the opportunity to agree or disagree with perceptual items concerning same subject.

Selection of participants

The focus of this study was to find out the effects of sports participation on the academic performance of senior high school students in mathematics.

Based on this reason, the study purposively selected 59 students who engage in sporting activities and 41 of their colleagues who do not participate in sporting activities at the senior high school level making 100 respondents. The respondents were drawn from five senior high schools in the Cape Coast Metropolis using the simple random sampling technique.

Validity and Reliability of Instrument

The phenomenon of interests in this study was to investigate the effects of sports participation on the academic performance of senior high school students in mathematics. The face validity of the instrument was determined by the researchers and colleagues in the area of mathematics education who are also experts in developing questionnaires, at the Department of Mathematics

and ICT Education, University of Cape Coast and a peer review team. Their suggestions were adhered to before the final questionnaire development. Cronbach alpha reliability test conducted on the items yielded an alpha value of 0.713 which was good enough. This is because the overall Cronbach's alpha co-efficient obtained indicate a strong reliability coefficient as emphasized by Jackson (2015) that Cronbach's alpha of 0.7 or more denotes strong reliability for the scale.

Data Collection Procedure

To be fair to the respondents and ensure high response rate of the items on the instrument administered as well as confidentiality, names of students who participated in the study were not recorded on the instrument. An initial visit was paid to the schools as well as the students, which were finally involved in the research. At these meetings, permission was sought from heads of the schools as well as students who were going to be involved in the study. At the meeting, the purpose of the study, its duration, and potential benefits were explained to the heads and teachers as well as all other participants for their consent to participate in the study and also allow the study to take place in their respective schools. Also, at these meetings, decisions about dates and times for the administration of the instrument were taken. In each school, questionnaires were administered to the participating students in their respective classrooms during classes normal class hours. Each session lasted for about forty-five minutes. The instruments were administered to all the 100 senior high school students who participated in the study across the five schools. The administered instruments were supervised by the researchers. The completed instruments were then collected from the students and analyzed based on the phenomenon.

DATA ANALYSIS AND DISCUSSION

As already mentioned, data for this study was obtained from senior high school first to final year students in the Cape Coast Metropolis using a four-point Likert scale questionnaire. The responses to the four-point Likert scale questionnaire as provided by the respondents were first edited, coded and entered as required. Since data collected from the field was meant to answer research questions that guided the study and as well as testing the hypothesis made in the study, data analysis was done and organized according to the study's research questions and hypothesis.

Data was analyzed and discussed quantitatively using graphs, frequencies, descriptive and inferential statistics (mean, standard deviation and t-test) to answer the research question and to test the hypothesis put forward in this study.

RESULTS AND DISCUSSION

Analysis of the demographic data of the respondents revealed that, there were 59 (59.0%) male students of which 40 (40.0%) of them participate in sports and 19 (19.0%) do not participate in sports. There were 41 (41.0%) female students of which 19 (19.0%) of them participate in sports and 22 (22.0%) do not engage in sports. There were as many as 87 (87.0%) students from the form two class while 5 (5.0%) and 8 (8.0%) students were from the forms one and three classes respectively. Frequency counts and percentages were used to analyse the research questions.

Research Question One:

To what extent do sports participation affect students' performance in mathematics?

The first research question that guided this study was, "To what extent do sports participation affect students' performance in mathematics?"

In answering the first research question, the results revealed that 54 (91.5%) student-athletes agreed that sports make them more active in class, 53 (89.3%) of them agreed that their grades in mathematics had improved when they joined the sports team in the school, 47 (79.7%) of the students also agreed that sports have positive influence on their concentration in mathematics and 45 (76.3%) agreed that sports do not affect their academic performance in mathematics. Furthermore, there are as many as 51 (86.5%) students who disagreed that sports make them retrogress in mathematics. In the same vein 52 (88.2%) of the student-athletes disagreed that their performance in mathematics has worsen when they joined sports. It can be inferred from the results that student-athletes had a positive perception towards mathematics even as they participate in sporting activities. It also revealed that the performance of students in mathematics is not worsened by their participation in sports. The finding is in line with the findings of Marsh and Kleitman (2002) who found that scholastic accomplishment of students increased as their participation level in sports also increased. In the same vein, National Association of State Boards of Education (NASBE) (2004) found out that student-athletes beat non-athletes in terms of academic achievements with the gap broadening the more athletes participates in sports.

Research Question Two:

To what extent does participation in sports affect students' learning time?

The second research question that guided this study was, "To what extent does participation in sports affect students' learning time? To answer this research question, data from the student participants were used for the analysis.

Analysis of results revealed that, as many as 30 (50.8%) and 22 (53.7%) of the student-athletes and non-athletes respectively usually go to bed as late as 10:01 PM – 12:00 AM on school days while 26 (44.1%) and 17 (41.5%) of the student-athletes and non-athletes respectively usually go to bed between 8:01 PM – 10:00 PM during weekends. Further analysis was conducted to

determine the extent to which sports participation affects students learning time. The result is presented in Figure 1.

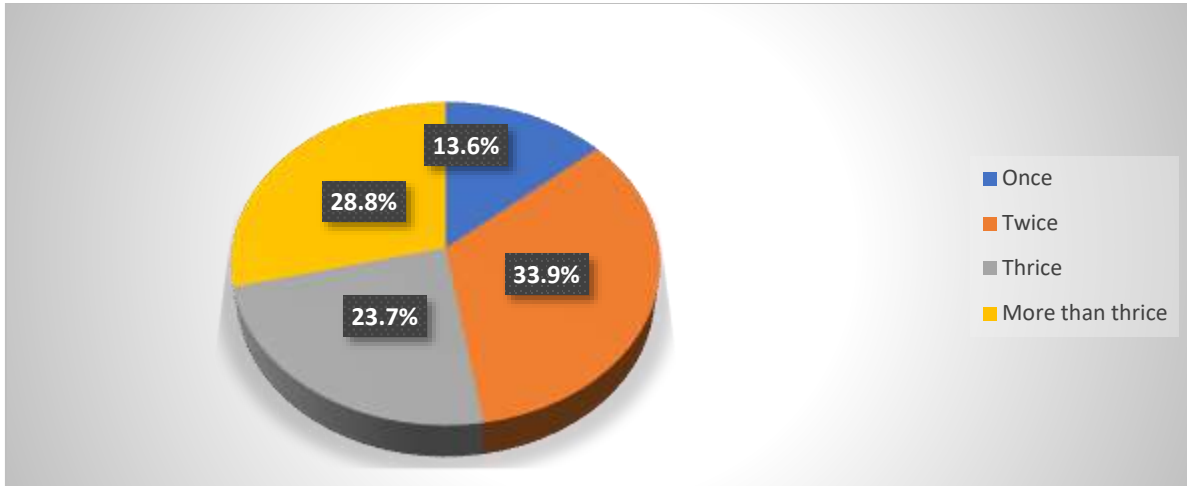


Figure 1: Number of Times Student-Athletes Participated in School Sport Competition

The student-athletes were asked to specify the number of times they participated in school sports competitions. A cursory look at Figure 1 revealed that majority of the student athletes [51(86.4%)] participate twice or more times in school sports competitions. This means that most of the student athletes are committed and deeply involved many times in sporting activities as and when the slated time for such is due.

Further analysis was conducted to verify the number of events these athletes are involved in. Figure 2 indicates the number of sporting events these student athletes are involved in.

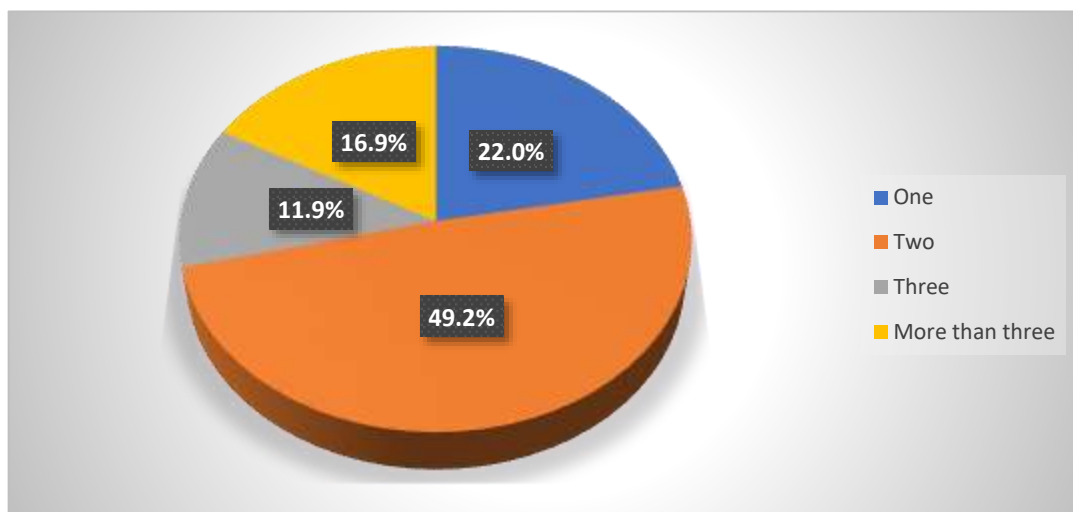


Figure 2: Number of Sports Events Student-Athletes are involved in

Figure 2 indicates that 46(77.96%) of the student athletes engage in two or more sporting events for their schools. This goes to buttress the number of times they participate in sports competition. Furthermore, to ascertain to what extent student athletes' participation in sporting activities affect their learning time, they were asked to specify the number of hours they practice during school days within a week. Figure 3 shows the number of hours' student-athletes practiced during school days within a week.

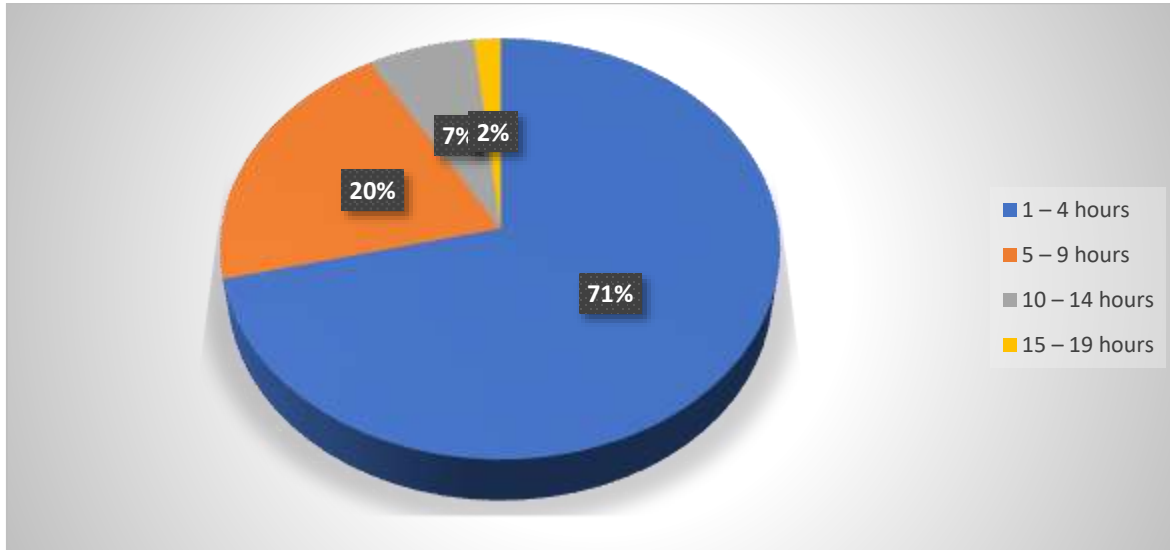


Figure 3: Number of Hours Student-Athletes Practiced within a week during the School days

The student-athletes were asked to specify the number of hours they practice during school days within a week. the number of hours they practice in the past week during the school week. Figure 3 shows that 42 (71.0%) of the students practiced for 1 – 4 hours, 12 (20.0%) of them practiced for 5- 9 hours, 4 (7.0%) of them practiced for 10 – 14 hours and 1 (2.0%) of the student practiced for 15 – 19 hours in the past week during the school week. To have a more comprehensive information regarding the extent to which sports participation affect their learning time, the study ascertained the number of hours the student-athletes practiced in school during the weekend. Results are presented in Figure 4.

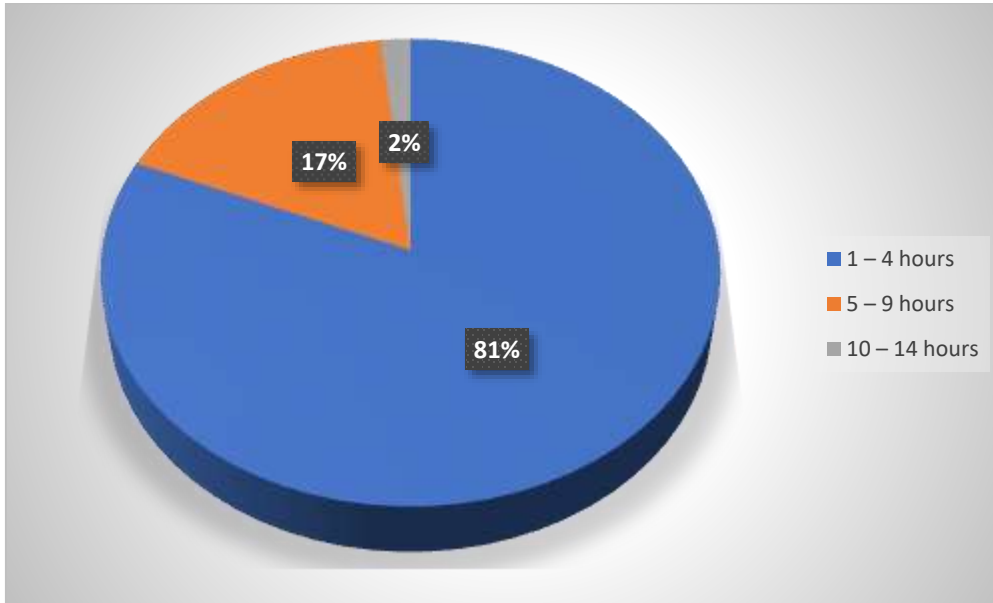


Figure 4: Number of Hours Student-Athletes Practiced in school during the Weekend

Results from Figure 4 revealed that 48 (81.0%) of the students practiced for 1– 4 hours, 10 (17.0%) of them practiced for 5- 9 hours, 1 (2.0%) of them practiced for 10 – 14 hours. It can be inferred from the previous analysis that student-athletes spend substantial amount of time participating in sports in Senior High Schools resulting from the number of hours they spend in training and practicing and the number of sporting activities they partake in. This finding is in conformity with the study of Ahamed, MacDonald, Reed, Naylor, Liu-Ambrose and Mckay. (2007) when they stated that even without jeopardizing their academic performance or progress, children can spend a little less time in academic learning and more time being physically active throughout the school day. From the discussion, it was observed that, whether students-athletes practice or not majority wake up at the same time as compared to those that wake up at different times and due to that it can be said that student-athletes practice time do not have any negative impact on their learning times.

Research Hypothesis

Ho: There is no statistically significant difference between the academic performance of students who participate in sports and their counterparts who do not in mathematics.

The research hypothesis that guided this study was, “There is no statistically significant difference between the performance of students who participate in sports and their counterparts who do not”. To answer this research hypothesis, data on students’ academic performance in mathematics were gathered and analysis performed using the independent-samples t-test. The results are presented in Table 1.

Table 1: Marks of Students in the Recent Previous Mathematics Examination

Marks (%)	Athletes		Non-Athletes	
	frequency	%	frequency	%
90 - 100	7	14.0	4	9.8
80 – 89	14	23.7	7	17.1
70 – 79	21	35.6	12	29.3
60 – 69	12	20.3	9	22.0
Less than 60	5	8.5	9	22.0

A critical look at Table 4 shows that, 7 (14.0%) of student-athletes had marks between 90 – 100% as against 4 (9.8%) of non-student athletes, 14 (23.7%) and 7 (17.1%) of student-athletes and non-athletes had marks between 80 – 89% respectively, and 21 (35.6%) of student athletes had marks between 70 – 79% as compared to 12 (29.3%) of non-student athletes. Also, 12 (20.3%) and 9 (22.0%) of student-athletes and non-student athletes respectively had marks between 60 – 69%. In addition, 5(8.5%) of student-athletes had marks less than 60 while 9 (22.0%) non-student athletes had marks less than 60%.

A further test was done using the independent-samples t-test to determine if there exists any difference in the performance of student-athletes and non-student athletes. This is presented in Table 2.

Table 2: Results of t-test and Descriptive Statistics on Academic Performance of Student-athletes and Non-Student Athletes

Group	Sample Size	Mean	Standard Deviation	Degrees of freedom	t-value	p-value
Student-athletes	59	2.90	1.125	98	-1.635	0.105
Non-student athletes	41	3.29	1.270			

Results from Table 2 shows that, the mean score of student-athletes in their recent core mathematics examination was 2.90 and that of non-student athletes was 3.29. The mean and standard deviation were calculated using the range of the scores of the students in their recent core mathematics examination for all student-athletes and non-student athletes respectively.

Though there is a difference in the means of the student-athletes and non-student athletes in favour of the non-student athletes, the standard deviation indicates that the performance of the student-athletes was more clustered than their counterparts who do not take part in sporting activities.

The t-calculated value was -1.635 and its p-value was 0.105 at 5% significant level. Since the p-value is greater than 0.05 significant level, we fail to reject the null hypothesis (H_0). It is therefore concluded that, there is no statistically significant difference between the performance of student-athletes and non-student athletes in core mathematics. This shows that the performance of the two groups were almost the same. Hence, there is no difference in the performance of the student-athletes and non-student athletes in core mathematics. This finding is not in conformity to the study of Marsh (1993) where he found a small, but significant, relationship between sports participation and higher academic achievement. Barber, Stone and Eccles (2005) also found that student athletes earned higher grades and were more likely to attend college which proved otherwise by the finding in this study.

CONCLUSIONS AND IMPLICATIONS FOR TEACHING AND LEARNING MATHEMATICS

The conclusions drawn from the research findings indicate that sports participation have no negative effect on the academic performance of student-athletes in mathematics. Also, participation in sports does not affect the learning time of students. Although students may spend substantial amount of time in partaking in sporting activities, they still get time to learn. These findings have the implication that student-athletes should not be discouraged from participating in sports with the misconception that participation in sports worsen students' general performance and specifically performance in mathematics. Students who possess the talent and ability to partake in sports should be motivated by their parents, teachers and school authorities to engage in sports since participation in sports has been shown to make students more active even in the classroom. When students present in the mathematics classroom are very active physically and cognitively, it would facilitate the teaching and learning of the subject.

Suggestions for Further Research

As a result of the research findings, it is suggested that the following be considered

1. A replication of this study using larger sample sizes from various second cycle institutions be used to validate these findings.
2. A study should be conducted on the effects of sports participation on the learning time of students.
3. A study should be conducted using achievement tests to determine the true performance of student-athletes and non-student-athletes.

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