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## **The Influence of Sports Participation on Students' Mathematics Academic Performance: A Systematic Review**

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### **Abstract**

Sports participation has been regarded as an important aspect of the physical, social, and cognitive development of students." The main aim of this is to find the relationship between sports participation and students' academic performance, especially in mathematics. The PRISMA framework was used by the researchers to guide this systematic review (Moher *et al.*, 2009) [13]. After the literature review, it was found that sports participation and sports activities are positively associated with students'

academic performance, particularly in math, students' motivation, students' self-esteem, students' cognitive development, and so on. In contrast, there are also a few researchers who observed that sports participation is neither negatively associated nor indirectly connected with academic performance. Lastly, this research concluded that sports participation is an important aspect of students' academic progress, and sports activities are important dimensions of students' holistic development.

**Keywords:** Sports Participation, Academic Performance, Mathematics Achievement, Physical Activity, Student Motivation

### **Introduction**

Mathematics is widely recognized as a fundamental subject in education because it develops logical reasoning, analytical thinking, and problem-solving skills that are essential for academic success and future careers (Metarobotics, 2025). Success in mathematics is influenced by various cognitive and non-cognitive factors, including motivation, self-concept, learning habits, and environmental influences (Weinhandl *et al.*, 2025; Abalde & Oco, 2023) [15, 1]. Because of its importance in students' academic development, researchers continue to investigate factors that may enhance or hinder mathematics performance.

One factor that has attracted increasing attention in educational research is students' participation in sports and physical activities. Sports are not only important for physical health but are also believed to contribute to psychological development, discipline, and social interaction among students. Participation in sports activities such as football, volleyball, basketball, and other athletic events may positively influence students' mental well-being and learning capacity, which may ultimately affect academic outcomes (International Journal of Social Sciences Bulletin, 2025). Schools often encourage sports participation because it promotes a balanced development between academic learning and physical activity.

Past studies have indicated that physical activity may have a positive impact on cognitive processes and academic performance. Studies on the impact of physical activity on academic performance in schools have shown that the integration of physical activity into the school routine may support or at least not negatively impact the mathematics performance of students (Sneck *et al.*, 2019) [14]. Additionally, a meta-analysis on studies on the impact of recreational physical activity has indicated a positive relationship between physical activity and the performance of students in subjects such as mathematics, science, technology, and engineering, which fall within the field of science, technology, engineering, and mathematics (STEM). It is therefore evident that the engagement of students in sports may have a positive impact on their academic performance through the enhancement of cognitive processes such as attention, memory, and problem-solving skills.

Sports participation can also affect how well students do in school because of the way it makes them feel. When students play sports, it can make them feel like they are good at something that they have control over, what they do and that they belong. These things are really important for students to want to learn and do well in school. Studies have shown that when students feel this way, they are more likely to pay attention in class and get grades. Sports involvement is really good for students because it helps them feel motivated to do their schoolwork. In addition to that, it should also be noted that sports participation can also help the students to develop the feeling of having the motivation to learn and perform well in their studies, and that is

really important for the students.

However, it should also be noted that despite the fact that an increasing number of studies have been conducted with the aim of determining the relationship between sports participation and academic performance of the students, there is a lack of a clear relationship between these two concepts. In addition to that, there is also a lack of synthesis of studies that have been conducted to determine the performance of the students in mathematics. The need to conduct a systematic study of literature with the aim of helping to understand the relationship between sports participation and academic performance of the students in mathematics has also necessitated the need to conduct the study.

### Methodology

The purpose of this research was to examine the impact of sports on students' performance in their math class. The researchers used a method called a systematic review. This is a good method to obtain all the literature on a specific topic and to have a better understanding of it. To carry out the research properly, the researchers have to follow some guidelines. The guidelines are called the PRISMA framework (Preferred Reporting Items for Systematic reviews and Meta-Analyses). The PRISMA framework is widely used to guide systematic reviews (Moher *et al.*, 2009) [13]. This is a good framework to help the researcher conduct the research properly. To carry out the research, the researchers have to obtain some literature on the research topic. To obtain the literature on the research topic, the researchers looked through some databases. Online sources like articles, theses, etc. The researchers only looked for literature on the impact of sports on students' performance in their math class. The researchers only looked for good literature on the research topic with real data. After the researchers obtained the literature on the research topic, they reviewed the literature to obtain some common ideas and differences.

By reading all these studies, the researchers were able to get an idea about the impact of sports on the performance of students in math. Thus, the researchers were able to compile all the evidence. Get a better idea of what is going on with sports and math.

### Results and Discussion

The findings from the reviewed studies reveal mixed but generally positive relationships between sports participation and students' academic performance, particularly in mathematics. Additionally, other studies have indicated that students who take part in sports activities are more likely to demonstrate better academic performance compared to those who do not take part in sports activities. For instance, a large-scale cross-sectional study was carried out among students in China, which showed that students who regularly participated in sports activities were more likely to achieve better grades in their main subjects, such as mathematics, compared to those who did not take part in sports activities (Zhang *et al.*, 2023) [18]. According to another study by Wretman (2017), sports activities were significantly associated with academic performance based on the development of self-esteem and body images.

Evidence from systematic reviews and meta-analyses further supports the positive role of physical activity in academic performance. Sneek *et al.* (2019) [14] found that school-based

physical activity interventions produced small but positive improvements in mathematics performance, while most other studies reported neutral outcomes and very few identified negative effects. Likewise, Yoh *et al.* (2025) [17] concluded that recreational physical activity significantly improves students' performance in STEM subjects, suggesting that physical engagement can support cognitive development and academic learning.

However, not all studies showed a direct relationship between sports participation and academic performance. A study on senior high school students showed that there was no statistical significant difference between the mathematics achievement of student-athletes and non-athletes (Yarkwah & Agyei, 2020) [16]. Moreover, Asamoah (2021) [2] revealed that sports participation is not necessarily a hindrance or enhancer of mathematics performance. The implication of the studies is that sports participation may not improve academic performance; on the other hand, it may not impede academic performance.

Other studies have also suggested that sports can influence academic performance indirectly via a psychological or motivational factor. In a study by Erdmann (2021) [4], it was determined that sports can have a direct impact on students' motivation, which was strongly linked to academic performance, although sports was not a direct predictor of academic achievement. This is supported by the Self-Determination Theory, which is based on the need to emphasize perceived competence, autonomy, and relatedness to enhance intrinsic motivation to learn (Muhammad, 2023) [9].

Moreover, sports activities can help in the development of cognitive and analytical skills that can be useful in the learning of mathematics concepts. Research conducted on the mathematical thinking ability of athletes has shown that the performance of some sports can be associated with the development of stronger reasoning and problem-solving skills (Onal *et al.*, 2017) [10]. Mathematics has been seen as essential in the analysis and evaluation of sports performance (Jalali, 2025) [7].

Despite these positive associations, some sport-related behaviors may negatively affect academic outcomes when they interfere with study time or increase psychological stress. For example, research on sports betting among students found that excessive betting activities were associated with decreased mathematics performance due to reduced study time, financial stress, and academic distraction (International Journal of Research and Innovation in Social Science, 2025) [6].

Overall, the studies that were reviewed suggest that the impact of sports participation on the academic performance of students in mathematics tends to be positive or neutral in most cases. Although the studies do not support the idea that sports participation directly impacts the academic performance of the students in mathematics, there is the possibility that such participation might have an indirect impact through the improvement of the students' motivation, mental health, and cognitive capabilities (Muhammad, 2023) [9].

### Conclusions

Based on the findings from the reviewed studies, it is clear that the impact of sports participation on students' mathematics academic performance is either positive or neutral. Although direct impact on academic outcomes is not

seen, sports participation may have an indirect impact on students' mathematics academic performance through motivation, students' psychological well-being, and cognitive skills. Therefore, it is important to encourage students to participate in sports activities while maintaining appropriate academic support and time management skills. In addition, it is important to conduct further research on other contextual factors, such as the type of sport and cultural differences, to understand the relationship between sports participation and students' mathematics academic performance.

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