INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY: APPLIED BUSINESS AND EDUCATION RESEARCH
2025, Vol. 6, No. 11, 5434 – 5439
http://dx.doi.org/10.11594/ijmaber.06.11.04

Research Article

Balancing Equations and Endurance: Enhancing the Engagement of Grade 10 STE Students in Sports Activities

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Article history:
Submission 04 August 2025
Revised 30 October 2025
Accepted 23 November 2025

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ABSTRACT

This action research examined the impact of a mini-sports tournament on the sports participation of Grade 10 Science, Technology, and Engineering (STE) students at Bulacan State University–Laboratory High School. The study aimed to address the decreasing engagement in physical activities among students who face heavy academic workloads. A pre-test and post-test survey measured students' participation levels before and after the intervention, and the data were analyzed using the Wilcoxon Signed Ranks Test, which yielded a *z*-score of −4.043 and a *p*-value of .000, indicating a statistically significant difference below the .05 level. Results showed a notable increase in students' enthusiasm, teamwork, and participation in sports following the tournament. The activity provided an avenue for relaxation and social interaction, helping students balance their academic responsibilities with physical well-being. The findings demonstrate that structured sports programs can effectively promote engagement and motivation without compromising academic performance. This study highlights the importance of integrating physical education and extracurricular sports into academic settings to foster holistic student development and enhance both physical health and academic productivity among high school learners.

Keywords: *Grade 10 Students, Mini-Sport Tournament, Physical Activity, Science Technology and Engineering (STE), Sports Participation, Student Engagement*

Background

Sports and academics were often viewed as two distinct domains—one emphasizing physical ability and the other intellectual achievement. However, students in the Science, Technology, and Engineering (STE) program frequently found themselves navigating both worlds simultaneously. These students were held to high academic expectations, often facing rigorous coursework and demanding

How to cite:
Mirador, A. J. F. (2025). Balancing Equations and Endurance: Enhancing the Engagement of Grade 10 STE Students in Sports Activities. *International Journal of Multidisciplinary: Applied Business and Education Research*. *6*(11), 5434 – 5439. doi: 10.11594/ijmaber.06.11.04

schedules. Consequently, the importance of maintaining a well-rounded lifestyle that included sports and physical activities was often overlooked.

Studies revealed that regular physical activity not only improved physical well-being but also was a major factor in minimizing stress, promoting cognitive functioning, and maintaining emotional well-being (Singh et al., 2019). Latest research also demonstrated a significant relationship between physical participation and academic achievement. For example, Liu et al. (2023) identified that Chinese schoolchildren who played sports on a regular basis exhibited significantly better academic performance than less active students. The same was observed in other settings and provided evidence for the fact that physical activity facilitated improved concentration, time management, and social interactions among students, all of which added to academic achievement (de Greeff et al., 2018; Marques et al., 2020). In the Filipino context, national monitoring indicated that most youth children and adolescents did not achieve the recommended levels of physical activity, with the "Overall Physical Activity" category receiving an "F" grade in the 2022 Report Card (Philippines Physical Activity Report Card Development Team, 2022). Such a low baseline for physical activity identified structural and institutional limits to sports participation among Filipino schools.

The Self-Determination Theory (Deci & Ryan, 2000) provided a theoretical lens for understanding these outcomes. The theory posited that students were more motivated and engaged when their needs for autonomy, competence, and relatedness were fulfilled. Sports participation inherently satisfied these psychological needs, thereby enhancing motivation, well-being, and even academic performance. In the case of STE students, the lack of physical engagement potentially diminished these intrinsic motivations, leading to academic stress and disengagement.

Empirical studies consistently link physical activity with improved cognitive functions such as memory skill, attention ability and executive control (Fernández-Espínola et al., 2022; Liu et al., 2023). Moreover, regular sports engagement contributes to emotional stability and stress reduction, supporting students' overall academic persistence (Açar & Duran, 2025). For STE students, who are often burdened by heavy academic responsibilities, structured sports programs may provide opportunities for psychological restoration and skill transfer that enhance learning performance.

This study aimed to explore the sports participation levels of Grade 10 STE students at Bulacan State University–Laboratory High School. It sought to identify how rigorous academic loads influenced their engagement in sports and to recommend strategies for fostering a culture that valued both intellectual and physical growth. By promoting structured opportunities for sports participation, schools could help students achieve a more balanced, motivated, and holistic educational experience.

Methods

This study followed the action research spiral of Kemmis and McTaggart (1988), a model consisting of four interconnected phases that guided this study: (1) planning, (2) action, (3) observation, and (4) reflection. The entire cycle was conducted over four weeks.

- **Week 1 (Planning Phase):** The researcher identified barriers that hindered students' sports participation through a pre-test survey and informal interviews. The data guided the design of a mini-sports tournament as the intervention.
- **Week 2 (Action Phase):** The mini-sports tournament was implemented, allowing students to engage in structured sports activities aimed at promoting teamwork, motivation, and a balanced lifestyle.
- **Week 3 (Observation Phase):** Data were gathered through attendance records, direct observation, and post-test surveys assessing changes in engagement and participation. Feedback from teachers and parents supported the triangulation of results.
- **Week 4 (Reflection Phase):** Pre-test and post-test data were analyzed to determine the intervention's effectiveness. The findings were discussed to identify lessons learned and propose strategies for sustaining student sports participation.

Research Questions

This study aims to answer the following questions:

1. How may the Grade 10 STE students' level of sports participation be described?
2. Is there a significant difference in the sports engagement of Grade 10 STE students before and after the mini sports intervention?

Ho: there is no significant difference on the engagement of Grade 10 STE Students in sports activities before and after the mini-tournament.

Ha: there is a significant difference in the engagement of Grade 10 STE Students in sports activities before and after the mini-tournament.

Participants of the Study

The participants of this study were 22 Grade 10 students enrolled in the Science, Technology, and Engineering (STE) program at Bulacan State University–Laboratory High School during the Academic Year 2024–2025. The class, Section Juliano, was selected through purposive sampling since it was the only section under the Grade 10 STE program. The group consisted of nine males and thirteen females (n = 22). These students were chosen because their demanding academic workload often limited their participation in sports and physical activities.

Instrument and Validation

The study utilized a researcher-made survey questionnaire to measure students' engagement and participation in sports activities. To establish content validity, the instrument was reviewed by three experts in physical education and educational research. Their suggestions led to minor revisions for clarity and relevance. Pilot testing was conducted with a comparable group of Grade 10 students from another section. The reliability of the survey was tested using Cronbach's alpha, which resulted in a coefficient of 0.86. This means that the survey items were highly consistent and dependable in measuring what they were intended to assess.

Data Analysis

Data were analyzed using the Wilcoxon Signed Ranks Test, a non-parametric test suitable for comparing paired samples from the same participants. It was used to assess differences in students' sports participation before and after the intervention. The test assumed that (a) the data were paired and came from the same population, (b) the differences between the paired observations were symmetrically distributed, and (c) the dependent variable was measured at least on an ordinal scale. The analysis determined whether the intervention resulted in a statistically significant improvement in engagement levels.

Ethical Considerations

Ethical standards were carefully observed throughout the research process. Approval was obtained from the BulSU–Laboratory High School MAPEH Teachers prior to data collection. Informed consent from parents and assent from students were secured. All information gathered was treated with strict confidentiality, and participants were free to withdraw at any stage of the study. The research adhered to the ethical principles of respect, beneficence, and non-maleficence.

Result and Discussion

This section presents the findings based on the research questions: (1) How may the Grade 10 STE students' level of sports participation be described? and (2) Is there a significant difference in their sports engagement before and after the mini-sports intervention? The discussion examines students' initial participation and the impact of the mini-sports tournament through pre-test and post-test results.

The following tables summarize the results of this study:

Table 1. Students' Level of Participation

Questions	Yes	No	Total
1. Are you part of any school sports team or club?	3	19	22
2. Do you participate in extracurricular sports outside school?	5	17	22

Questions	Yes	No	Total
3. Have you joined any sports-related school events (e.g., intramurals, tournaments, fun runs)?	10	12	22
4. Do you participate in sports activities at least once a week (inside or outside school)?	6	16	22

Table 1 shows that only three students were members of a school sports team or club, while nineteen were not. Similarly, five students participated in extracurricular sports outside school, whereas seventeen did not. In terms of school-related sports events such as intramurals and tournaments, ten students had participated, while twelve had not. Additionally, only six students engaged in sports activities at least once a week, whereas sixteen did not.

These results indicated that the majority of Grade 10 STE students had minimal involvement in structured sports activities prior to the intervention. This limited participation could be attributed to heavy academic loads, lack of time, or limited institutional encouragement for physical activities—issues that mirror the national findings of the Philippines Physical Activity Report Card Team (2022), which graded the "Overall Physical Activity" of Filipino adolescents an "F."

Table 2. Effect of the Mini-Sports Tournament

Test Period	Pre-Test	Post-Test
Average Score (Mean)	3.58	4.07

Table 2 compares the pre-test and post-test mean scores on sports engagement, showing an increase from 3.58 to 4.07. Although the numerical change appeared modest, it reflected a practically meaningful improvement in students' motivation, enjoyment, and sense of belonging in sports. Several students expressed in reflection journals that the tournament "made sports feel achievable even with academic demands" and "helped classmates bond beyond the classroom."

These qualitative insights suggested that the mini-sports tournament fostered social connection, teamwork, and intrinsic motivation, aligning with Self-Determination Theory (Deci & Ryan, 2000), which posits that fulfilling autonomy, competence, and relatedness enhances motivation and sustained participation.

The findings were consistent with Liu et al. (2023), who found that school-based sports participation significantly correlated with improved academic engagement among Chinese students, and with Gao et al. (2025), whose study emphasized that structured physical programs boost students' motivation and overall engagement. Similarly, local educational guidelines from DepEd (2022) advocated the inclusion of physical activities in secondary education as a means to promote holistic development.

Table 3. Wilcoxon Signed Ranks Test Results for Student Engagement in Sports Activities

Wilcoxon Signed Ranks Test	
	Pre-Test Average – Post-Test Average
Z-score	-4.043
Asymp. Sig. (2-tailed)	.000

As shown in Table 3, the Wilcoxon Signed Ranks Test yielded a Z-score of −4.043 and a p-value of .000, which was below the .05 significance level. Thus, the null hypothesis (H_0) stating that there was no significant difference in student engagement before and after the mini-tournament was rejected. The alternative hypothesis (H_a) was accepted, indicating a significant increase in engagement following the intervention.

Beyond statistical significance, this improvement represented a behavioral and

motivational shift. Students became more willing to participate in physical activities, recognizing sports as a productive outlet for stress relief and peer interaction. The results reinforced the assertion of the DepEd K–12 Curriculum Guide in Physical Education (2016) that structured and inclusive physical programs enhance not only physical fitness but also socio-emotional skills and academic balance.

Summary of Findings

Overall, the mini-sports tournament effectively improved the sports engagement of Grade 10 STE students. The observed increase from 3.58 to 4.07, supported by a statistically significant Wilcoxon Z value, suggested that **even short-term, structured physical activities can meaningfully enhance motivation and participation**. The findings support both global and local evidence that integrating sports programs within the academic environment promotes student well-being, teamwork, and balanced development.

Conclusion

The findings of the study revealed a significant increase in the sports engagement of Grade 10 Science, Technology, and Engineering (STE) students after the implementation of the mini-sports tournament. The intervention proved effective in motivating students to participate more actively in physical activities despite their demanding academic workload. The results underscored that structured, inclusive, and time-bound sports programs could foster teamwork, motivation, and holistic development among students.

The small sample size and brief intervention duration were two of the study's limitations though. These limitations restricted the findings' applicability to different grade levels or contexts. To investigate the long-term impacts of sports-based interventions on student engagement and wellbeing, future research could contemplate about undertaking longitudinal studies. A more thorough understanding of how structured sports programs affect students' patterns of physical activity and academic motivation may also be possible by broadening the participant pool to include students from different grade levels or academic disciplines.

Based on these findings, the following recommendations were proposed:

1. **Institutionalize Mini-Sports Tournaments**
   The school administration and the STE program may consider including mini-sports tournaments as part of the regular academic calendar. Such activities could be integrated within the Physical Education program or homeroom initiatives to promote continuous engagement in sports.
2. **Integrate Physical Activities within Academic Schedules**
   Teachers and school administrators may collaborate to allocate short but regular periods for physical breaks or sports-related activities within the weekly class schedule. This can help students manage stress, maintain focus, and balance academic and physical development.
3. **Strengthen Collaboration between PE Teachers and STE Faculty**
   Interdisciplinary cooperation may be encouraged by allowing PE teachers to work closely with STE faculty in planning activities that align both academic and physical objectives. This partnership can ensure that sports programs are supportive of the academic rigor of the STE curriculum while promoting students' well-being.
4. **Encourage Continuous Evaluation and Student Feedback**
   Regular monitoring of student engagement and feedback on physical activities is recommended to ensure the sustainability and effectiveness of sports initiatives. Data-driven insights can further improve the design and inclusivity of school-based physical programs.

Through these measures, the school community may continue fostering an environment that values both academic excellence and physical well-being, ensuring that students develop holistically and maintain a healthy balance between intellectual growth and active li

Acknowledgement

I would like to express my deepest gratitude to Bulacan State University for providing an academic environment that cultivates growth, research, and innovation. My heartfelt appreciation also goes to my professors in the Graduate School, whose wisdom, guidance, and encouragement have been instrumental in the completion of this research.

I am sincerely thankful to my friends and colleagues in the workplace for their unwavering support, understanding, and motivation. Their words of encouragement inspired me to persevere through challenges and continue striving toward my academic and professional goals.

Above all, this accomplishment would not have been possible without the collective support of everyone who believed in my capacity to learn, improve, and succeed.

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