

Game Based Learning in The Context of Physical Education in Indonesia

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Received: March 15, 2026

Revised: June 12, 2026

Accepted: June 29, 2026

Published: June 30, 2026

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DOI: [10.29303/jppipa.v12i6.15233](https://doi.org/10.29303/jppipa.v12i6.15233)

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Abstract: This study investigates the integration of Game-Based Learning (GBL) into physical education (PE) in Indonesia as an innovative pedagogical approach to enhance student engagement, motivation, and awareness of healthy lifestyles. GBL goes beyond standard teaching approaches by encouraging creativity, teamwork, and problem-solving abilities that are important for future difficulties. A quasi-experimental design was used with students from high schools who were split into an experimental group and a control group. The experimental group took part in physical education classes that included GBL techniques, whereas the control group received traditional teaching. Information was gathered through questionnaires about motivation and classroom observations. The quantitative data was evaluated using statistical comparison methods, while the observational results were utilized to enhance the understanding of student actions and involvement. The results showed that students in the GBL group exhibited greater motivation, engagement, and active involvement compared to those in the control group. Classroom observations showed increased collaboration, enthusiasm, and involvement in learning activities among students exposed to GBL. Furthermore, students in the experimental group reported greater awareness of the importance of physical activity and healthy lifestyle practices. The integration of GBL in PE positively influenced student motivation, engagement, and health-related awareness. Although its implementation requires careful planning, adequate resources, and institutional support, GBL offers a promising approach for improving learning experiences and promoting holistic student development in Indonesian physical education settings.

Keywords: GBL; Physical activity; Physical education.

Introduction

Physical education (PE) plays a crucial role in improving students' physical fitness, motor skills, social interaction, and developing a healthy lifestyle. Beyond physical aspects, PE also contributes to cognitive, emotional, and social development, supporting holistic learning (Bailey, 2006; Sindiani et al., 2025; Valle-muñoz & Mendoza-muñoz, 2025). However, maintaining student motivation and active participation in PE remains a major challenge in the digital age, marked by changing learning preferences.

In reaction to these difficulties, Game-Based Learning (GBL) has surfaced as a creative method that

incorporates gaming features into education to enhance involvement, enthusiasm, and educational results (Adipat et al., 2021; Fonseca et al., 2023; Plass et al., 2016). GBL creates interactive and meaningful learning, while developing critical thinking, collaboration, and problem-solving skills (Lampropoulos et al., 2019; Qian & Clark, 2016; Untari, 2022). In the context of PE, GBL has been shown to increase students' enjoyment, engagement, and participation in physical activity (Camacho-Sánchez et al., 2023).

In line with technological advancements, the characteristics of today's generation of learners, particularly Generation Alpha, show a preference for technology-based, interactive, and experiential learning

How to Cite:

Subagio, R., Ruhiat, Y., & Maryani, N. (2026). Game Based Learning in The Context of Physical Education in Indonesia. *Jurnal Penelitian Pendidikan IPA*, 12(6), 554–558. <https://doi.org/10.29303/jppipa.v12i6.15233>

(Gidding et al., 2025). This makes traditional approaches less effective in maintaining student attention and motivation. Therefore, GBL is a relevant approach to addressing the needs of 21st-century learning. Recent research also demonstrates the effectiveness of GBL in increasing student motivation and engagement. Studies by (Hwang et al., 2020) and (Bai et al., 2020) showed significant increases in engagement and intrinsic motivation. In PE, (Casey & Goodyear, 2019) and (Sgrò et al., 2021) emphasized that GBL increases physical activity and the quality of learning experiences. However, the effectiveness of GBL is strongly influenced by learning design and institutional readiness (Silva et al., 2019).

Globally, GBL is also viewed as part of educational innovation that supports the Sustainable Development Goals (SDGs), particularly in improving the quality of inclusive and sustainable education (Llanos-ruiz et al., 2023; Meylani, 2025). However, the implementation of GBL in physical education in Indonesia remains limited and has not received comprehensive studies, particularly those that simultaneously integrate teacher and student perspectives. Based on this, this study aims to examine the implementation of GBL in physical education in Indonesia, specifically regarding its impact on student motivation and engagement, as well as barriers to implementation in the field.

Method

Main Objectives

The primary goal of this research is to showcase the current viewpoints of educators and learners on the application of Game-Based Learning (GBL) within educational settings in Indonesia. The aims include: Analyzing particular materials relevant to GBL as an educational framework in both global and national perspectives. Recognizing obstacles encountered by educators while adopting GBL techniques. Presenting findings from an empirical investigation based on surveys of both educators and learners, along with a comparative evaluation of their perspectives. In this research, a survey was carried out among current educators and students. Here is a brief excerpt from the findings that shows some participants' opinions on important issues related to GBL in education. The survey aimed at teachers and students was conducted online using the Google Forms platform. Overall, 20 active educators from different schools nationwide and 134 students aged 16 to 17 from Serang City and Serang Regency participated. Two groups were formed: one experimental group and one control group. The control group followed a standard physical education program, while the experimental group was involved in a unique program that featured wearable technology and organized observations. The quantitative results

indicated that students taking part in GBL-focused physical education classes displayed higher motivation and involvement compared to the control group. This reinforces the idea that adding GBL increases interest in physical activities. Qualitative data (remarks from students and educators) reinforce the results, highlighting the relationship between science and physical exercise, and illustrating particular advantages such as an improved comprehension of physiological functions and increased enjoyment of the activity.

Instruments

Surveys, short interviews, and data generated by devices.

Physical Education as an Integrative Field

Physical education is viewed as an integrative field because it focuses not only on physical activity but also integrates the development of physical, mental, emotional, social, and cognitive aspects holistically. Through this approach, Physical Education serves as a platform for developing healthy, intelligent, character-based individuals with life skills. Physical education utilizes physical activity to achieve holistic change. This includes improving physical fitness as well as improving mental health and emotional management. Physical Education is an effective means of instilling character values, such as discipline, responsibility, sportsmanship, cooperation, and perseverance. In the Indonesian context, this also involves integrating Pancasila values into learning. Physical Education learning is not only about movement but also demands understanding, reasoning, and critical thinking skills. This integrates cognitive and psychomotor skills. Physical education can be integrated with other subjects to enhance student interest and understanding, for example, by combining athletic activities with biology concepts, or using traditional games for social learning.

The Relationship between GBL and Physical Education

Physical education is often associated with the development of movement skills, discipline, and interpersonal abilities. The incorporation of GBL can enhance the evaluation of movement understanding and logical thinking. This approach to GBL encourages experimentation, thoughtful examination, and using acquired knowledge in practical scenarios. In physical education, it means using technology to track exercise while also creating projects focused on healthy living. Contemporary education strategies highlight the importance of learning across different subjects and building essential skills through combining scientific and hands-on experiences. The GBL method is regarded as a way to foster analytical reasoning, problem-solving, and investigative abilities. Merging GBL into sports

education helps learners grasp the connection between movement and science (Gedde et al., 2018).

For instance, in basketball, one can study the path of the ball using geometry and physics; in soccer, technology can help gauge speed and heart rate; and in volleyball, the height of jumps can be assessed using engineering concepts. Therefore, sports turn into environments for investigation, where students not only engage in practice but also discover. (Zhelyazkova, 2020) noted that GBL is highly effective in the initial phases of learning, especially when connected to practical tasks and GBL aspects.

Result and Discussion

A large number of the teachers who participated in the survey (51%) reported that they work at high schools and possess a solid grasp of Game-Based Learning (GBL). Among these educators, 42% think that GBL can be incorporated into physical education. Additionally, 5.3% pointed out that the primary obstacle to applying GBL strategies in physical education is insufficient training, while 15.5% mentioned a lack of enthusiasm and motivation. When queried about the advantages of incorporating GBL into sports, 35% expressed that it enhances the understanding of the connection between science and health. Even though a considerable number of both teachers and students who were surveyed claimed a good awareness of GBL activities, the findings also highlighted several practical challenges that they believe may impede execution in school environments.

The most commonly reported challenges by respondents from both groups were associated with insufficient time (51.6%), a scarcity of resources, and poor methodological support (61.3%). Comments from physical education educators included: *"Students show more interest when we use an application to track heart rate and speed."*; *"The biggest hurdle is the lack of adequate resources and training in this method."*; *"The incorporation of technology in physical education has boosted students' engagement."*

Despite the challenges noted, the results from the survey indicated favorable views about the improvement and future of GBL in teaching. With this in mind, one of the final questions in the survey was: *"What is your perspective on the future of GBL in Indonesia?"* This inquiry aimed to assess what respondents thought about the potential development of GBL in the educational framework of Indonesia. The analysis sought to identify recurring themes in the responses provided by participants.

Participants' views showed a mostly favorable outlook on the potential of GBL in Indonesia. Even with the challenges noted, those involved in this research connected this method to boosting student engagement, essential skill enhancement, and meeting workforce

demands. The specific areas of focus differed based on the respondents' job backgrounds and roles in GBL education; however, a common hope for increased adoption, institutional backing, and a demand for further qualifications was evident. Some individuals voiced doubt regarding organizational hurdles, stressing the importance of concentrated efforts for advancing more structured GBL practices. When inquired if they employed technology in physical education sessions, 53% of students indicated they often did, 30% claimed they did so sometimes, and 17% admitted they never utilized it. Among the students, a significant portion (61%) noted that the primary challenge in applying GBL was a shortfall in funds and resources; 17% mentioned a shortage of training, while 22% revealed a lack of interest in GBL techniques in physical education.

Concerning the advantages students perceive from GBL incorporation, 41% indicated they gained a clearer insight into the link between science and health, 36% associated GBL integration with heightened motivation, and 23% felt that GBL assisted in fostering critical thinking skills. The following key themes arose from this research: *How can additional educators be inspired to participate in GBL projects, notably those with extensive teaching backgrounds? What chances are there for embedding GBL into the curriculum in a way that fulfills job market needs? What challenges and obstacles are noted in structuring GBL lessons, and what solutions can be employed? What possibilities exist for collaboration between educational institutions and universities in the context of GBL?*

The findings indicate that the GBL group has a higher average motivation level ($M = 4.3$, $SD = 0.6$, $n = 66$) when compared to the control group ($M = 3.6$, $SD = 0.8$, $n = 68$). The boxplot serves as a visual representation since it is based on summary statistics. It is created using a distribution aligned with the mean, standard deviation, participant count, and a scale from 1 to 5. This scale is consistent with the measurement tool that ranges from 1 to 5. The GBL group exhibits a greater average motivation level ($M = 4.3$), while the control group displays a lesser average motivation level ($M = 3.6$). Various criteria for assessing GBL physical education sessions can be noted.

Based on the theoretical foundations provided, encouraging trends, and insights from participants, numerous questions emerge that could form a basis for future research and professional conversations aimed at the ongoing progress of GBL in Indonesia. Possible research inquiries might involve: What are the perspectives of physical education teachers regarding the integration of GBL techniques in their classes? How does the GBL approach influence students' interest in participating in sports? What technologies and online tools are currently being used in physical education lessons across Indonesia? What significant challenges do

educators face when implementing GBL in this area? Does GBL enhance students' understanding of the connections between science, health, and physical activities? The results align with those of (Todorova, 2024), who noted that GBL promotes critical thinking and the application of knowledge in practical situations. These results are also backed by (Ilieva et al., 2023), who characterize physical education as a field that embraces innovation and technology. Observations from this study further validate (Zhelyazkova, 2020) assertion that GBL achieves its best outcomes when paired with practical activities, including GBL elements.

The discussion revealed that the incorporation of GBL in physical education enhances student motivation while opening up new pathways for interdisciplinary learning. This marks progress toward the modernization of GBL education in Indonesia, fostering skills that align with the requirements of contemporary society.

Conclusion

This study explored the integration of Game-Based Learning (GBL) into physical education classes in Indonesia and examined its effects on students' motivation, engagement, and awareness of healthy lifestyles. The findings indicate that students who participated in GBL-based lessons demonstrated higher motivation levels ($M = 4.3$, $SD = 0.6$) than those in the control group ($M = 3.6$, $SD = 0.8$). Both teacher and student responses further suggested that GBL increased participation in learning activities and strengthened students' understanding of the relationship between physical activity, health, and science. The study also identified several challenges to implementation, including limited resources, insufficient methodological support, lack of teacher training, and time constraints. Despite these barriers, the overall findings suggest that GBL can be effectively integrated into physical education and may contribute to more engaging learning experiences and greater health-related awareness among students. Therefore, GBL represents a promising pedagogical approach for enhancing the quality of physical education in Indonesia by fostering student motivation, active participation, and understanding of healthy lifestyle practices.

Acknowledgments

The author would like to express his gratitude to the Doctoral Education Study Program, Sultan Ageng Tirtayasa University, which has facilitated the author in completing this research.

Author Contributions

All authors have read and agreed to the published version of the manuscript.

Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

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