



ADERIC-Based Joyful Learning in Physical Education: Effects on Motivation and Engagement

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ABSTRACT

Implementation of the ADERIC Model Based on Joyful Learning in Physical Education: Effects on Student Motivation and Classroom Engagement. Student motivation and classroom engagement are important factors in achieving effective learning outcomes in physical education. However, many physical education classes still experience low student motivation and limited active participation during learning activities. This study aimed to examine the effect of the ADERIC model based on joyful learning on students' learning motivation and classroom engagement in physical education. This study employed a quantitative approach using a pretest-posttest design. The research was conducted at SMA Negeri 3 Kota Sorong, involving 30 eleventh-grade students selected through purposive sampling. The learning intervention was implemented through the five stages of the ADERIC model: Accumulation, Demonstration, Exercise, Reflection, and Creation. Data were collected using questionnaires measuring students' learning motivation and classroom engagement. The data were analyzed using paired sample t-test analysis with SPSS. The results showed a significant increase in both variables after the implementation of the ADERIC model. The mean motivation score increased from 61.3 to 79.4, while the mean engagement score increased from 56.6 to 76.7. These findings indicate that the ADERIC model based on joyful learning positively influences students' motivation and classroom engagement in physical education learning. This study contributes to innovative pedagogical strategies that support more interactive, enjoyable, and student-centered physical education learning environments.

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INTRODUCTION

Physical education (PE) plays a crucial role in promoting students' physical literacy, lifelong physical activity habits, and holistic well-being within contemporary education systems worldwide (Beni et al., 2017; Carlos-Vivas & Mendoza-Muñoz, 2025; Vasconcellos et al., 2020). Recent international discussions emphasize that quality PE should not only develop motor skills but also foster students' motivation and meaningful engagement in learning activities (Adi et al., 2025; Beni, 2021; Van Doren et al., 2026). Studies have



highlighted that enjoyment and positive emotional experiences during PE lessons significantly influence students' willingness to participate in physical activity and sustain active lifestyles beyond school contexts (Elden & Lagestad, 2026). Furthermore, global educational frameworks increasingly advocate for student-centered pedagogies that enhance intrinsic motivation and active participation in PE learning environments (Yan et al., 2025) (Masombe Ag, Mawardi, 2026). However, many schools still struggle with declining student motivation and limited classroom engagement in physical education due to monotonous teaching strategies and insufficient pedagogical innovation (Kelso et al., 2020). Consequently, researchers and educators have begun exploring innovative instructional approaches that emphasize enjoyment, meaningful learning experiences, and active student participation in physical education settings.

A growing body of research across different countries has investigated pedagogical strategies aimed at improving students' motivation and engagement in PE. For example, studies examining the Sport Education Model demonstrate that structured and student-centered PE instruction can significantly enhance students' academic motivation and engagement during physical activity learning (Hoyo-Guillot et al., 2025). Similarly, research on differentiated instructional strategies in physical education indicates that adapting learning activities to students' needs can increase participation and learning involvement in PE classes (Bond, 2024). Other empirical studies reveal that student motivation in PE is closely related to positive learning environments that encourage autonomy, enjoyment, and meaningful participation (Sindiani & Tsuk, 2025). More specifically, emerging studies highlight the importance of integrating joyful and meaningful learning experiences to increase engagement and academic performance in physical education contexts (Mawardi et al., 2025). These findings collectively suggest that instructional approaches emphasizing enjoyment, active participation, and supportive learning climates can significantly contribute to improved motivation and engagement in PE learning.

Recently, innovative instructional models that promote active participation and meaningful learning have gained increasing attention in physical education. One instructional model that has potential to support student-centered learning is the ADERIC model, which consists of five stages: Accumulation, Demonstration, Exercise, Reflection, and Creation (Kahar et al., 2024). The ADERIC model emphasizes active knowledge acquisition, practical demonstration, repetitive exercise, reflective learning processes, and creative student participation during learning activities (Kahar et al., 2022). These characteristics are considered relevant to the principles of joyful learning, which focus on creating enjoyable, engaging, and meaningful learning environments for students.

Despite these promising findings, several research gaps remain in the literature regarding the integration of joyful learning approaches in physical education. First, although previous studies have examined various pedagogical models that enhance motivation and engagement, relatively limited empirical research specifically focuses on joyful learning as a structured instructional approach in PE contexts (Guldager et al., 2025). Second, many existing studies emphasize physical activity outcomes or general learning achievement rather than examining the combined effects of joyful learning on both student motivation

and classroom engagement simultaneously (Adi et al., 2025). Third, engagement in PE is increasingly conceptualized as a multidimensional construct encompassing behavioral, cognitive, emotional, and agentic components; however, empirical investigations integrating these dimensions within joyful learning interventions remain scarce (Perera, 2024). As a result, there is a need for updated research that systematically examines how joyful learning strategies influence both motivational and engagement aspects of students' learning experiences in physical education classrooms.

Although previous studies have investigated joyful learning and active learning approaches in physical education, limited research has specifically examined the integration of the ADERIC model based on joyful learning in improving students' learning motivation and classroom engagement (Kahar et al., 2023). Most existing studies focus primarily on general pedagogical approaches without exploring how structured instructional stages such as Accumulation, Demonstration, Exercise, Reflection, and Creation influence students' motivational and engagement-related outcomes simultaneously. Therefore, further empirical investigation is needed to examine the effectiveness of the ADERIC model in physical education contexts (Kahar et al., 2024).

In response to these gaps, the present study offers several contributions to the current body of knowledge in physical education pedagogy. First, this research investigates the integration of a joyful learning approach specifically within physical education instruction, emphasizing enjoyable, interactive, and student-centered learning activities that encourage active participation. Second, the study simultaneously examines two critical educational outcomes—student learning motivation and classroom engagement—which are widely recognized as key determinants of effective learning processes in PE (Yan et al., 2025). Third, this research contributes empirical evidence regarding how joyful learning strategies can create a more positive learning climate that promotes meaningful participation and sustained student interest in physical education activities. By addressing these aspects, the study provides updated insights into how innovative pedagogical approaches can support the development of more engaging and motivating PE learning environments.

The novelty of this study lies in the integration of the ADERIC instructional model with joyful learning principles in physical education to simultaneously improve students' motivation and classroom engagement through structured and student-centered learning stages (Kahar et al., 2022). Therefore, the purpose of this study is to examine the effectiveness of the joyful learning approach in physical education in enhancing students' motivation and classroom engagement. Specifically, this research aims to answer two primary research questions: (1) Does the joyful learning approach influence students' learning motivation in physical education? and (2) Does the joyful learning approach influence students' classroom engagement in physical education? Addressing these questions is important because motivation and engagement are key predictors of successful learning experiences and sustained participation in physical activity among students (Kelso et al., 2020). The findings of this study are expected to provide empirical evidence that supports the integration of joyful learning strategies in PE instruction and contribute to the development of more effective pedagogical practices in physical education.

METHODS

This study employed a quantitative research approach to examine the effects of the joyful learning approach on students' learning motivation and classroom engagement in physical education. Quantitative research is widely used in educational studies to investigate causal relationships between instructional interventions and measurable learning outcomes through statistical analysis (Cheung & Slavin, 2013). In physical education research, quantitative designs are particularly useful for examining the effectiveness of pedagogical strategies on motivational and behavioral outcomes among students (Ntoumanis et al., 2017). Previous studies have demonstrated that quantitative approaches enable researchers to objectively measure students' psychological responses, such as motivation and engagement, through standardized instruments and statistical testing (Vasconcellos et al., 2020). Therefore, this approach was considered appropriate for identifying the statistical relationship between the joyful learning intervention and students' motivation and engagement in physical education classes.

Data in this study were collected using a structured questionnaire designed to measure students' learning motivation and classroom engagement in physical education. Questionnaire-based surveys are commonly used in educational research because they allow researchers to collect standardized data regarding students' perceptions, attitudes, and behavioral engagement efficiently (Fredricks et al., 2019). Several recent studies in physical education have utilized questionnaires to assess students' motivation and engagement in learning activities, as these constructs are often psychological and subjective in nature (Sparks et al., 2021). Moreover, questionnaire instruments enable researchers to quantify students' responses using Likert-scale measurements, which can then be analyzed statistically to determine the effects of specific instructional strategies (Howard et al., 2021). In this study, the questionnaire items were adapted from validated instruments used in previous research on student motivation and engagement in physical education contexts to ensure reliability and validity.

The research was conducted at Senior High School 3 Sorong (SMA Negeri 3 Kota Sorong), Indonesia, focusing on students enrolled in physical education classes. School-based physical education settings provide an authentic learning environment for investigating how instructional approaches influence students' participation and learning behaviors (Van Doren et al., 2026). Conducting research in real classroom contexts is important because students' motivation and engagement in physical education are strongly influenced by classroom climate, teacher instructional strategies, and peer interaction during learning activities (Vasconcellos et al., 2020). Therefore, implementing the study within an actual school environment allowed the researcher to observe the practical effects of the joyful learning approach on students' learning experiences in physical education.

The participants of this study were 11th-grade students at SMA Negeri 3 Sorong, who were selected as the research subjects. A total of 30 students participated in the study. The sampling technique used was purposive sampling, which allows researchers to select participants based on specific characteristics relevant to the objectives of the study (Etikan & Bala, 2017). In educational research, purposive sampling is frequently applied when

researchers aim to investigate a particular group that has direct experience with the instructional intervention being studied (Campbell et al., 2020). In this study, students were selected purposively because they were actively involved in physical education classes where the joyful learning approach was implemented. This sampling strategy ensured that the participants had sufficient exposure to the instructional approach being evaluated.

The research instrument used in this study was a self-administered questionnaire consisting of items measuring two main variables: students' learning motivation and classroom engagement in physical education. The questionnaire utilized a five-point Likert scale ranging from strongly disagree to strongly agree to capture the degree of students' responses. Likert-scale instruments are widely recommended in educational and psychological research because they allow researchers to measure attitudes and perceptions quantitatively and consistently (Joshi et al., 2015). Items related to learning motivation were adapted from validated motivation scales used in physical education studies grounded in self-determination theory, which conceptualizes motivation as a key predictor of student participation and persistence in learning activities (Ntoumanis et al., 2021). Meanwhile, items measuring classroom engagement were adapted from engagement frameworks that consider behavioral participation, attention, and active involvement in learning tasks (Fredricks et al., 2019). Prior to data collection, the questionnaire was reviewed to ensure clarity and appropriateness for the participants.

Implementation of the ADERIC Model

The learning intervention in this study was conducted using the ADERIC learning model based on joyful learning principles. The model consists of five instructional stages: Accumulation, Demonstration, Exercise, Reflection, and Creation. At the Attention stage, the teacher stimulated students' interest and readiness through enjoyable warm-up games and motivational activities. During the Discussion stage, students discussed learning tasks and movement strategies collaboratively in small groups. In the Exploration stage, students actively explored physical movement activities and problem-solving tasks through interactive games and physical challenges.

During the Accumulation stage, students received initial information and understanding related to learning materials and physical activities. In the Demonstration stage, the teacher demonstrated movement techniques and learning tasks. The Exercise stage involved students practicing physical skills through interactive and enjoyable activities. In the Reflection stage, students reflected on their learning experiences, difficulties, and achievements during the lesson. Finally, in the Creation stage, students were encouraged to develop creative movement activities and collaborative learning performances. The integration of joyful learning principles aimed to create a positive, enjoyable, and student-centered learning atmosphere throughout all ADERIC stages.

The research procedure consisted of several stages. First, the researcher obtained permission from the school administration and the physical education teacher to conduct the study in the selected class. Ethical considerations in educational research emphasize the importance of obtaining institutional approval and ensuring voluntary participation of students (Bond, 2024). Second, the joyful learning approach was implemented during physical

education lessons through enjoyable, interactive, and student-centered activities designed to create a positive learning atmosphere. Previous research indicates that joyful and engaging learning environments can enhance students' intrinsic motivation and encourage active participation in physical education activities (Van Doren et al., 2026). Third, after the learning sessions were completed, students were asked to complete the questionnaire to measure their motivation and engagement levels during the learning process.

Data analysis in this study was conducted using inferential statistical analysis, specifically the t-test, to determine whether the joyful learning approach had a significant effect on students' learning motivation and classroom engagement. The t-test is commonly used in quantitative educational research to examine differences or relationships between variables when sample sizes are relatively small (Burkins et al., 2023). This statistical method enables researchers to determine whether the observed effects are statistically significant and not due to random variation. The data were analyzed using Statistical Package for the Social Sciences (SPSS) software, which is widely used in educational research for data management and statistical testing (Khairuddin & Kasduri, 2022). Through this analysis, the study aimed to identify whether the joyful learning approach significantly influenced students' motivation and engagement in physical education learning.

RESULTS AND DISCUSSION

Result

Figure 1 presents the comparison of students' learning motivation scores before and after the implementation of the joyful learning approach in physical education classes. The figure illustrates the mean motivation scores obtained during the pretest and posttest measurements. Based on the data displayed, the mean score of student motivation increased from approximately 61.3 in the pretest to about 79.4 in the posttest following the implementation of joyful learning activities. This indicates an improvement of more than 18 points in the average motivation score after the intervention. The noticeable increase in the posttest mean score suggests that students demonstrated higher levels of enthusiasm, interest, and willingness to participate in physical education learning when the joyful learning approach was applied.

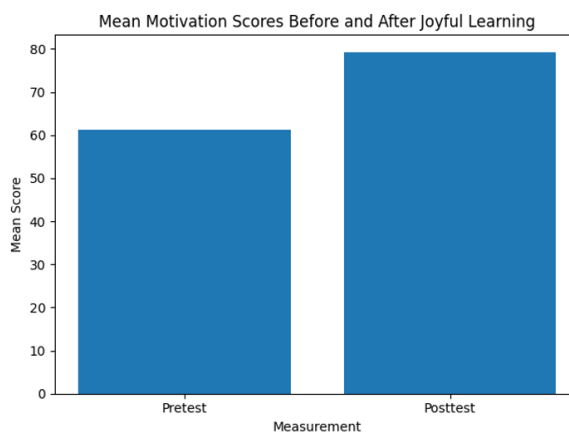


Figure 1.
Mean Motivation Score

The pattern displayed in Figure 1 clearly shows a positive shift in students' motivational levels between the two measurement stages. During the pretest phase, the average motivation score was at a moderate level, reflecting that students' initial motivation toward physical education learning was relatively limited prior to the instructional intervention. After the joyful learning approach was implemented, the posttest results revealed a considerably higher mean score, indicating that students experienced stronger learning motivation during physical education activities. This increase suggests that the use of enjoyable, interactive, and student-centered learning strategies can create a more stimulating learning environment that encourages students to actively participate in physical education lessons.

Furthermore, the substantial difference between the pretest and posttest mean values indicates that the joyful learning approach had a positive influence on students' motivational responses during the learning process. The higher posttest score demonstrates that students became more interested in the learning activities and more motivated to engage in the physical education tasks provided by the teacher. This improvement also suggests that joyful learning strategies may help reduce boredom and increase students' positive perceptions toward physical education classes.

Overall, the results shown in Figure 1 provide empirical evidence that the implementation of the joyful learning approach is associated with improved student motivation in physical education learning. The increase in mean scores from pretest to posttest indicates that students' motivation levels improved after participating in learning activities designed using joyful learning principles. These findings support the research hypothesis that the joyful learning approach has a positive effect on students' learning motivation in physical education. Consequently, the results suggest that integrating joyful learning strategies into physical education instruction can enhance students' motivational engagement and create a more positive learning experience in the classroom.

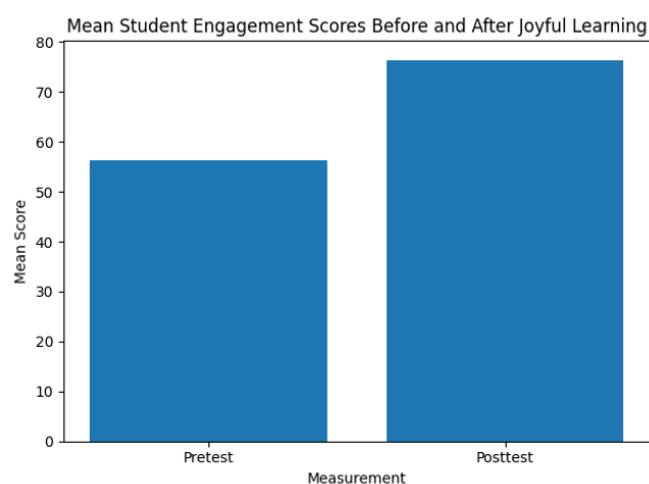


Figure 2.
Mean Student Engagement Score

Figure 2 illustrates the comparison of students' classroom engagement scores before and after the implementation of the joyful learning approach in physical education lessons.

The figure presents the mean engagement scores obtained during the pretest and posttest measurements. Based on the data shown in the figure, the mean student engagement score increased from approximately 56.6 in the pretest to around 76.7 in the posttest after the joyful learning intervention was applied. This represents an increase of more than 20 points in the average engagement score, indicating a notable improvement in students' active participation in physical education learning activities.

The pattern displayed in Figure 2 shows a clear upward trend between the two measurement stages. During the pretest phase, students' engagement levels were relatively moderate, suggesting that students initially demonstrated limited involvement in learning activities such as participating in physical tasks, interacting with peers, and responding to teacher instructions. After the joyful learning approach was implemented, the posttest results revealed a significantly higher mean engagement score. This indicates that students became more actively involved in classroom activities, demonstrating greater attention, participation, and enthusiasm during physical education lessons.

The increase in engagement scores suggests that the joyful learning approach created a more interactive and supportive learning environment that encouraged students to become more involved in the learning process. Activities designed to be enjoyable and collaborative likely contributed to increased student participation, as students were more willing to take part in physical tasks and group-based exercises. The substantial difference between pretest and posttest mean values reflects the potential effectiveness of joyful learning strategies in promoting students' behavioral engagement during physical education classes. Furthermore, the magnitude of improvement observed in the posttest scores indicates that joyful learning not only enhances students' emotional experiences in the classroom but also strengthens their behavioral involvement in learning activities. Higher engagement levels suggest that students were more attentive, responsive, and actively participating in the physical education tasks provided during the learning sessions.

Overall, the results presented in Figure 2 provide empirical evidence that the implementation of the joyful learning approach was associated with improved classroom engagement among students in physical education learning. The increase in mean engagement scores from pretest to posttest indicates that students became more actively involved in the learning process after experiencing joyful learning activities. These findings support the research hypothesis that the joyful learning approach positively influences students' classroom engagement in physical education. Consequently, the results highlight the potential of joyful learning strategies to foster more dynamic, participatory, and engaging physical education learning environments.

Discussion

The improvement in students' motivation and classroom engagement may be influenced by the structured stages of the ADERIC model. The Accumulation stage helped students understand learning materials and objectives more effectively, while the Demonstration stage provided clear examples of movement techniques and learning tasks. Furthermore, the Exercise stage encouraged active participation through enjoyable

physical activities. The Reflection stage allowed students to evaluate their learning experiences, and the Creation stage promoted creativity and collaborative participation during physical education learning.

The findings of this study indicate that the implementation of the joyful learning approach in physical education was associated with increased levels of student motivation and classroom engagement. These results suggest that learning environments emphasizing enjoyment, interaction, and active participation may positively influence students' psychological and behavioral involvement in physical education activities. From a theoretical perspective, this finding aligns with the principles of Self-Determination Theory (SDT), which emphasize that learning environments that support autonomy, competence, and relatedness can enhance intrinsic motivation and student engagement in educational settings (Vasconcellos et al., 2020). In the context of physical education, enjoyable learning experiences are considered important because they foster positive emotional responses that encourage students to participate more actively in physical activity learning tasks (González, 2022). These theoretical perspectives help explain why joyful learning strategies may contribute to higher motivation and engagement among students in physical education classes.

The increase in students' learning motivation observed in this study is consistent with several previous studies that highlight the importance of enjoyable and student-centered pedagogical approaches in physical education. For instance, research conducted in European school contexts found that teaching strategies emphasizing enjoyment and meaningful participation significantly improved students' intrinsic motivation toward physical activity learning (Vasconcellos et al., 2020). Similarly, a study examining the Sport Education Model demonstrated that learning environments that incorporate interactive and enjoyable activities can strengthen students' motivational orientations and increase their willingness to participate in physical education classes (Bessa et al., 2021). These findings support the argument that instructional strategies designed to create positive emotional experiences during learning can strengthen students' interest and enthusiasm toward physical education. In line with these studies, the joyful learning approach implemented in this research appears to create a supportive and engaging learning atmosphere that encourages students to become more motivated during physical education lessons.

In addition to improving motivation, the results also suggest that joyful learning contributes to increased student engagement in physical education classrooms. Student engagement is widely recognized as a multidimensional construct that includes behavioral participation, emotional involvement, and cognitive investment in learning activities (Fredricks et al., 2019). Research conducted in physical education settings has demonstrated that learning environments that promote enjoyment, collaboration, and student interaction tend to generate higher levels of engagement among students (Sparks et al., 2021). Similarly, studies examining need-supportive teaching practices have shown that when teachers provide enjoyable and autonomy-supportive learning activities, students become more actively involved in learning tasks and demonstrate higher engagement during physical education lessons (Van Doren et al., 2026). The present study

therefore reinforces the view that joyful learning strategies can create conditions that stimulate students' active participation and behavioral involvement in physical education learning.

However, it is important to acknowledge that not all studies report uniformly positive effects of enjoyable learning strategies on student motivation and engagement. Some researchers argue that enjoyment alone may not be sufficient to sustain long-term motivation if learning activities are not accompanied by clear instructional structure and skill development opportunities (Kerner et al., 2022). In this regard, certain studies have emphasized that while enjoyable learning environments can increase students' short-term participation, sustained engagement requires a balance between fun activities and meaningful skill mastery (Fletcher et al., 2021). These perspectives highlight that the effectiveness of joyful learning approaches may depend on how such strategies are integrated with pedagogical goals and structured learning outcomes. Nevertheless, the findings of the present study indicate that when joyful learning activities are implemented within a structured physical education context, they can positively influence both motivational and engagement-related outcomes.

From a theoretical standpoint, this study contributes to the growing body of literature emphasizing the importance of affective learning experiences in physical education pedagogy. Traditional physical education instruction has often focused primarily on physical performance and skill acquisition, sometimes overlooking students' emotional and motivational experiences during learning (Beni et al., 2022). The results of this study support emerging perspectives suggesting that integrating positive emotional experiences—such as enjoyment and playful learning—can enhance students' overall learning engagement and contribute to more meaningful educational experiences in physical education. This finding reinforces contemporary pedagogical frameworks that advocate for student-centered and enjoyable learning environments as key components of effective physical education instruction.

In terms of practical implications, the findings of this study provide valuable insights for physical education teachers and curriculum developers. Teachers may consider incorporating joyful learning strategies such as cooperative games, interactive activities, and creative movement tasks in order to enhance students' motivation and engagement during physical education lessons. Research indicates that when students experience enjoyment and positive social interaction during physical education activities, they are more likely to develop long-term interest in physical activity and maintain active lifestyles beyond school settings (González, 2022). Additionally, joyful learning strategies can help reduce students' anxiety or reluctance toward physical education, particularly among students who may feel less confident in their physical abilities (Sparks et al., 2021). By creating a supportive and enjoyable learning atmosphere, teachers can foster greater participation and improve students' overall learning experiences in physical education.

Overall, the results of this study highlight the potential of joyful learning approaches to enhance both student motivation and classroom engagement in physical education contexts. These findings contribute to ongoing discussions regarding the importance of

integrating enjoyable, student-centered pedagogical strategies within physical education curricula. Future research may further explore how joyful learning interventions influence other educational outcomes, such as physical literacy development, long-term physical activity participation, and students' psychological well-being in school-based physical education programs.

CONCLUSION

This study concludes that the implementation of the ADERIC model based on joyful learning positively influences students' learning motivation and classroom engagement in physical education. The structured instructional stages of Accumulation, Demonstration, Exercise, Reflection, and Creation created a more interactive, enjoyable, and student-centered learning environment that encouraged students to participate actively in learning activities.

The novelty of this study lies in its empirical examination of joyful learning as an instructional approach specifically within physical education contexts while simultaneously analyzing its effects on both student motivation and classroom engagement (Karatlau et al., 2026). Previous studies have often examined these variables separately or within broader pedagogical models. This study contributes to the literature by demonstrating that joyful learning can function as an integrated pedagogical strategy capable of influencing both psychological motivation and behavioral engagement in learning. From a theoretical perspective, the findings support motivational frameworks in educational psychology that highlight the role of positive emotional experiences and supportive learning environments in promoting intrinsic motivation and active learning participation. From a practical standpoint, the results provide useful insights for physical education teachers and curriculum developers regarding the potential benefits of incorporating enjoyable, student-centered learning strategies in order to enhance students' participation and learning experiences in physical education.

Despite these contributions, several limitations should be acknowledged. First, the study involved a relatively small sample size drawn from a single school, which may limit the generalizability of the findings to broader educational contexts. Second, the use of questionnaire-based data collection relies on students' self-reported perceptions, which may be influenced by subjective responses. Future research should therefore consider involving larger and more diverse samples across different schools and regions to strengthen the generalizability of the results. In addition, further studies may incorporate mixed-method approaches, including classroom observations or interviews, to gain deeper insights into how joyful learning influences students' learning experiences in physical education. Exploring the long-term effects of joyful learning on students' physical activity participation, physical literacy development, and well-being may also provide valuable directions for future research. Overall, this study highlights the importance of integrating enjoyable and engaging learning approaches as a key strategy for improving the quality of physical education teaching and learning.

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