



Improving Student Participation Through the Implementation of a Target-Based Javelin Throwing Game at SMPN 1 Gambut

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Abstract

Student engagement remains a critical factor in achieving meaningful learning outcomes in Physical Education, Sports, and Health (PJOK). Limited participation during instructional activities may reduce learning effectiveness and restrict opportunities for students to develop both physical and social competencies. This study investigated changes in student participation following the integration of a target-based javelin throwing game into PJOK instruction at SMPN 1 Gambut. A quantitative pre-experimental approach was adopted using a one-group pretest–posttest design. The study involved 30 students who were selected through total sampling. Student participation was measured using a validated questionnaire with acceptable internal consistency (Cronbach's Alpha = 0.768). Data were analyzed through descriptive statistics, the Shapiro–Wilk normality test, and a paired-samples t-test using SPSS version 25. The findings revealed a substantial increase in participation levels after the intervention. Prior to the implementation of the target-based javelin throwing activity, most participants were categorized as having low (63.3%) or very low (16.7%) levels of participation. Following the intervention, participation improved markedly, with 90.0% of students classified in the very high category and the remaining 10.0% in the high category. Assumption testing confirmed that the data met the normality requirement ($p > 0.05$). Furthermore, the paired-samples t-test demonstrated a statistically significant difference between pretest and posttest participation scores ($p < 0.001$). These results suggest that incorporating a target-oriented javelin throwing game into PJOK lessons was associated with higher levels of student participation. The activity appears to provide a more engaging learning environment that encourages active involvement during instruction. Nevertheless, because the study employed a single-group design without a comparison group, the findings should be interpreted as evidence of improvement following the intervention rather than definitive proof of causality. Future studies using more rigorous experimental designs are recommended to further examine the effectiveness of this instructional approach.

Keywords: Target-Based Javelin Throwing Game; Physical Education; Game-Based Learning.

How to Cite: Rizki, M. L., Amirudin, A., Darumoyo, K., & Dirgantoro, E. W. (2026). Improving Student Participation Through the Implementation of a Target-Based Javelin Throwing Game at SMPN 1 Gambut. *Empiricism Journal*, 7(2), 1474-1481. <https://doi.org/10.36312/ej.v7i2.5366>



<https://doi.org/10.36312/ej.v7i2.5366>

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INTRODUCTION

Physical Education, Sports, and Health (PJOK) plays a significant role in supporting students' holistic development by integrating cognitive, affective, and psychomotor learning through structured physical activities. Beyond improving movement competence, physical education contributes to the development of personal and social values such as responsibility, discipline, cooperation, and sportsmanship, which are essential for students' everyday lives (Jumadi et al., 2021, p. 425). The extent to which these educational goals are achieved is closely associated with students' willingness to actively engage in learning activities.

Student participation is widely recognized as a key indicator of effective learning because it reflects learners' mental, emotional, and physical involvement in instructional processes (Rahmatullah, 2017, p. 11). Active participation enables students to interact more meaningfully with learning experiences, leading to improved understanding, stronger motivation, enhanced social interaction, and better learning outcomes. Conversely, limited participation may reduce the effectiveness of instruction, as students become passive recipients rather than active contributors to the learning process. Holis et al. (2025, p. 208) emphasize that participation reflects the degree to which students take an active role in classroom and practical learning activities. Student participation can be enhanced through innovative learning approaches, such as game-based activities that create a more enjoyable, interactive, and motivating learning environment (Haffyandi et al., 2024, p. 152).

Despite its importance, maintaining high levels of student participation remains a challenge in many physical education settings. Previous studies have suggested that insufficient engagement is often linked to repetitive instructional practices, limited variation in teaching methods, and a lack of opportunities for students to become actively involved in learning tasks (Ningsih, 2024, p. 31). In addition, technological advancements and increasingly sedentary lifestyles have contributed to a decline in students' interest in physical activity (Wiarto, 2015, p. 23). As a result, many learners demonstrate low enthusiasm and minimal involvement during PJOK lessons (Yusuf & Wicaksana, 2025, p. 284).

Athletics is one of the core components of the PJOK curriculum and includes fundamental movement skills such as running, jumping, walking, and throwing (Sumarna, 2021, p. 36). These activities provide important opportunities for developing motor competence and physical fitness. However, athletics instruction is frequently perceived by students as repetitive and less engaging than other forms of physical activity, particularly when learning experiences are delivered through conventional drills with limited elements of challenge or enjoyment. Such conditions may reduce students' motivation to participate actively during lessons (Darumoyo, 2025, p. 213).

Preliminary observations conducted in Grade VIII athletics classes at SMP Negeri 1 Gambut revealed relatively low levels of student participation. Approximately 53.3% of the 30 observed students demonstrated limited engagement during learning activities. Several students appeared reluctant to attempt assigned tasks, participated minimally in practical exercises, and tended to wait for teacher instructions rather than taking initiative during lessons. Furthermore, some students expressed a lack of enthusiasm toward athletics activities because they perceived them as monotonous and less enjoyable. These findings suggest the need for instructional approaches capable of creating a more engaging and participatory learning environment.

Game-based learning has been widely discussed as an effective strategy for increasing student engagement in physical education. By incorporating elements of enjoyment, challenge, and interaction, games can transform learning activities into more meaningful experiences that encourage active involvement (Susanto, 2017, p. 101). Within PJOK contexts, game-oriented instruction has been reported to increase students' interest in learning while simultaneously promoting participation in physical activities. According to Alfajri and Hadi (2024, p. 2123), integrating game activities into physical education lessons can foster greater student motivation and encourage more active engagement throughout the learning process.

The present study focuses on a target-based javelin throwing game as an instructional modification within athletics education. Rather than emphasizing conventional javelin-throwing practice, this activity incorporates designated targets that students attempt to hit through repeated throwing tasks. The inclusion of specific targets introduces elements of challenge and achievement, potentially increasing concentration, motivation, and participation. In addition to encouraging active involvement, the activity may also contribute to the development of movement coordination, throwing accuracy, teamwork, confidence, and sportsmanship during learning sessions.

Evidence from previous studies supports the educational value of game-based approaches in PJOK. Ningsih (2024, p. 33) reported that games can enhance student participation by creating enjoyable and less monotonous learning experiences. Similarly, Mochammad Ilmawan Amiruddin et al. (2024, p. 130) found that game modifications in physical education contributed positively to students' learning motivation and active involvement during instruction. Collectively, these findings indicate that appropriately designed games can serve as effective pedagogical tools for increasing student engagement.

Although existing research has highlighted the benefits of game-based learning in physical education, relatively little attention has been given to the use of target-oriented javelin throwing activities within athletics instruction. This gap is noteworthy because throwing events are often perceived as less attractive by junior secondary school students, making instructional adaptation particularly important. Developing learning activities that are safe, enjoyable, and aligned with students' developmental characteristics may therefore represent a promising approach to enhancing participation in athletics lessons.

The novelty of this study lies in the application of a target-based javelin throwing game as a modified athletics learning activity specifically designed to strengthen student participation. By integrating clear performance targets into throwing tasks, the intervention seeks to create a more interactive and motivating learning environment that encourages students to engage actively throughout the instructional process. It is anticipated that this approach will promote greater willingness to participate, increase learning motivation, and enhance overall involvement in PJOK activities.

Based on these considerations, the present study investigates differences in student participation before and after the implementation of a target-based javelin throwing game in PJOK classes at SMP Negeri 1 Gambut. The findings are expected to contribute to the development of innovative instructional strategies capable of fostering greater student engagement and improving the quality of physical education learning experiences.

METHOD

This study employed a quantitative approach using a pre-experimental research design. Specifically, a one-group pretest–posttest design was adopted to examine changes in students' participation levels following the implementation of a target-based javelin throwing game in Physical Education, Sports, and Health (PJOK) lessons. Although this design is suitable for preliminary intervention studies, it does not include a comparison group. Consequently, observed changes between pretest and posttest measurements may have been influenced by factors beyond the intervention itself, including testing effects, maturation, historical events, novelty effects, teacher-related influences, or participants' awareness of being observed. Therefore, the findings should be interpreted with appropriate caution.

The research was conducted during the second semester of the 2025/2026 academic year at SMP Negeri 1 Gambut. Participants consisted of all students enrolled in Class VIII H, totaling 30 students. Because the entire accessible population was included in the study, a total sampling technique was employed.

Student participation was measured using a self-report questionnaire based on a five-point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1). The instrument was designed to assess multiple dimensions of participation, including physical involvement, cognitive engagement, emotional commitment, and social interaction during PJOK learning activities. Representative items included statements such as "I participate enthusiastically in PJOK lessons," "I actively attempt every assigned movement," and "I actively engage in game activities."

Prior to data collection, the instrument underwent psychometric testing involving 30 respondents. Item validity was evaluated using Pearson's Product–Moment correlation with a critical value of $r = 0.344$ at the 5% significance level. Of the 30 initial items, 17 met the validity criterion, with correlation coefficients ranging from 0.366 to 0.659. The remaining 13 items were excluded from further analysis. Internal consistency reliability was subsequently assessed using Cronbach's Alpha, yielding a coefficient of 0.768, which indicates satisfactory reliability and acceptable internal consistency for research purposes.

Participation levels were classified into five categories: very low, low, moderate, high, and very high. Category boundaries were established using the class interval method. Based on the 17 valid questionnaire items, the minimum possible score was 17 and the maximum possible score was 85, resulting in an interval width of 14 points for category classification.

Data collection involved questionnaire administration as the primary source of information, supported by observational records and documentation. At the beginning of the study, participants completed a pretest questionnaire to assess baseline participation levels. The intervention was then implemented over four instructional sessions, each lasting 4 × 40 minutes. During these sessions, students participated in a target-based javelin throwing game using modified throwing equipment designed to ensure safety within the school environment. The activity required students to throw toward designated targets, creating a learning experience that combined skill practice with game-based challenges. Throughout the intervention, the teacher acted as a facilitator by providing instructions, explaining game procedures, and supervising learning activities. Following the completion of the intervention period, participants completed the posttest questionnaire to evaluate changes in their participation levels.

Data analysis was performed using IBM SPSS Statistics Version 25. Descriptive statistics were used to summarize participation scores and describe overall participation patterns before and after the intervention. The Shapiro–Wilk test was applied to assess the normality of the data distribution. To examine differences between pretest and posttest participation scores, a paired-samples t-test was conducted with a significance level of 0.05. Statistical significance was determined when the probability value was less than 0.05 ($p < 0.05$).

RESULTS AND DISCUSSION

Results

The results in this study describe the changes in student participation before and after the implementation of the target-based javelin throwing game in PJOK learning. The findings are presented through descriptive statistics, frequency distribution of participation levels, normality testing, and paired-samples t-test analysis. The descriptive and frequency analyses were used to provide an overview of students' participation patterns before and after the intervention, while the normality test was conducted to determine the suitability of the data for parametric testing. Furthermore, the paired-samples t-test was used to examine whether there was a statistically significant difference between the pretest and posttest participation scores. The results are presented in the following tables.

Table 1. Descriptive Statistics of Student Participation Scores

Statistik	Pretest	Posttest
Sample Size (N)	30	30
Mean	39,87	77,60
Median	40,50	78,00
Standar Deviasi	9,115	4,022
Varians	83,085	16,179
Minimum	20	67
Maksimum	60	85
Range	40	18

The descriptive analysis indicates a substantial improvement in student participation following the intervention. Before the implementation of the target-based javelin throwing game, the average participation score was 39.87, suggesting relatively limited involvement in learning activities. In contrast, the posttest mean increased to 77.60, representing a gain of 37.73 points. This marked increase suggests that students became more actively engaged during PJOK lessons after participating in the modified game-based activity.

Changes were also evident in the distribution of scores. While pretest scores ranged from 20 to 60, posttest scores ranged from 67 to 85, indicating an upward shift across the entire sample. Furthermore, the reduction in the standard deviation from 9.115 to 4.022 and the decrease in variance from 83.085 to 16.179 suggest that participation levels became more consistent among students following the intervention. Taken together, these findings imply that improvements were experienced by most participants rather than being concentrated among a small number of individuals.

Table 2. Frequency Distribution of Pretest Participation Levels

Category	Frequency	Percentage
Very Low	5	16,7%
Low	19	63,3%
Moderate	5	16,7%
High	1	3,3%
Very High	0	0%
Total	30	100%

The pretest results demonstrate that student participation was generally low prior to the intervention. Nearly two-thirds of the participants (63.3%) were classified in the low participation category, while an additional 16.7% fell within the very low category. Only one student (3.3%) achieved a high participation score, and none were categorized as very high.

This distribution suggests that active engagement during PJOK lessons was limited before the introduction of the target-based javelin throwing activity.

Tabel 3. Frequency Distribution of Posttest Participation Levels

Category	Frequency	Percentage
Very Low	0	0%
Low	0	0%
Moderate	0	0%
High	3	10%
Very High	27	90%
Total	30	100%

A markedly different pattern emerged after the intervention. The majority of participants (90.0%) were classified in the very high participation category, while the remaining 10.0% were categorized as high. No students remained in the very low, low, or moderate categories. This substantial shift in participation levels provides preliminary evidence that the target-based javelin throwing game was associated with increased student engagement during PJOK instruction.

Tabel 4. Shapiro–Wilk Normality Test Results

Variable	Statistik	Sig.
Pretest	0,981	0,848
Posttest	0,948	0,148

Prior to hypothesis testing, the normality assumption was examined using the Shapiro–Wilk test because the sample size was fewer than 50 participants. The results revealed significance values of 0.848 for the pretest and 0.148 for the posttest. Since both values exceeded the threshold of 0.05, the null hypothesis of normal distribution could not be rejected. These findings indicate that the data were normally distributed and therefore suitable for subsequent parametric analyses.

Tabel 5. Hasil Uji Paired Sample t-Test

Variable	Mean Difference	t hitung	df	Sig. (2-tailed)
Pretest – Posttest	-37,733	-18,818	29	0,000

The paired-samples t-test revealed a statistically significant difference between pretest and posttest participation scores, $t(29) = -18.818$, $p < 0.001$. The mean difference of -37.733 indicates that participation scores increased substantially following the intervention. Based on these findings, the null hypothesis was rejected, indicating that participation levels after the implementation of the target-based javelin throwing game differed significantly from those observed before the intervention.

From a practical perspective, the magnitude of the observed improvement appears considerable. The transition from predominantly low participation levels at baseline to overwhelmingly high and very high participation levels at posttest suggests that the game-based activity created a more engaging learning environment. Nevertheless, because the study employed a one-group pretest–posttest design without a control group, the findings should be interpreted as evidence of increased participation following the intervention rather than definitive proof of causality. Alternative explanations, including testing effects, novelty effects, and other contextual influences, cannot be completely ruled out.

Discussion

The findings indicate a substantial increase in student participation following the implementation of the target-based javelin throwing game in Physical Education, Sports, and Health (PJOK) lessons. Descriptive results revealed a marked shift from predominantly low participation levels before the intervention to predominantly very high participation levels afterward. This pattern was further supported by the paired-samples t-test, which identified a statistically significant difference between pretest and posttest scores. These results suggest that participation increased considerably during the period in which the modified game-based activity was introduced.

One possible explanation for this improvement lies in the interactive nature of the target-based javelin throwing game. Unlike conventional instruction that may position students as passive recipients of information, the activity required learners to engage directly in physical tasks, collaborate with peers, and pursue clearly defined performance goals. Such conditions are consistent with the concept of participation proposed by Rahmatullah (2017, p. 11), who describes participation as involving physical, emotional, and cognitive engagement in learning activities. By providing opportunities for active involvement across multiple dimensions, the game appears to have encouraged broader student engagement throughout the learning process.

The distribution of participation scores provides additional insight into the observed changes. Prior to the intervention, a large proportion of students were classified within the low and very low participation categories, suggesting limited engagement during PJOK lessons. Classroom observations indicated that many students were hesitant to attempt activities independently, demonstrated minimal initiative during practice sessions, and relied heavily on teacher direction. Similar challenges have been identified in previous studies, which report that limited instructional variation and insufficient student-centered activities can reduce learner motivation and participation in physical education settings (Ningsih, 2024, p. 31; Yusuf & Wicaksana, 2025, p. 284).

Following four instructional sessions incorporating the target-based javelin throwing game, participation levels increased markedly. Students appeared more willing to attempt throwing activities, showed greater attentiveness to instructions, and engaged more actively with their peers. The competitive yet enjoyable structure of the activity may have contributed to these outcomes. The presence of a clear target provided an immediate objective, while the challenge of achieving successful throws likely enhanced motivation and sustained interest. In addition, the collaborative format encouraged communication and social interaction among students, which may have further strengthened engagement during lessons.

These findings are consistent with previous research highlighting the educational value of game-based learning approaches. Susanto (2017, p. 101) argues that games create enjoyable learning experiences that can increase student involvement and enthusiasm. Likewise, studies conducted by Ningsih (2024, p. 33) and Mochammad Ilmawan Amiruddin et al. (2024, p. 130) reported that game modifications in physical education settings can enhance active participation by making learning activities more engaging and interactive. The present study extends this body of evidence by demonstrating similar outcomes within the context of a modified javelin-throwing activity designed for junior secondary school students.

Despite these positive findings, the results should be interpreted cautiously. The exceptionally high posttest scores may not be attributable solely to the intervention itself. Factors such as the novelty of the activity, students' awareness of being observed, social desirability bias in questionnaire responses, and other contextual influences may also have contributed to the observed improvements. Consequently, although the findings provide encouraging evidence regarding the potential of the target-based javelin throwing game, stronger research designs are needed before firm causal conclusions can be drawn.

Study Limitations

Several limitations should be considered when interpreting the results of this study. First, the research employed a one-group pretest–posttest design without a comparison group. As a result, alternative explanations such as testing effects, maturation, history effects, novelty effects, Hawthorne effects, and teacher-related influences cannot be completely ruled out. Second, the sample was limited to a single class consisting of 30 students, which restricts the generalizability of the findings. Third, the intervention period was relatively short, making it difficult to determine whether the observed increase in participation would be sustained over a longer period. Therefore, the results should be viewed as evidence of increased participation following the intervention rather than definitive proof that the intervention alone caused the observed changes.

CONCLUSION

The study found that student participation in PJOK lessons increased following the implementation of a target-based javelin throwing game. Improvements were evident in both

descriptive and inferential analyses, with participation levels shifting from predominantly low categories before the intervention to predominantly very high categories afterward. Statistical testing also confirmed a significant difference between pretest and posttest participation scores ($p < .001$).

These findings suggest that incorporating target-oriented game activities may represent a promising approach for enhancing student engagement in physical education. By creating a learning environment that is enjoyable, challenging, and interactive, the activity appeared to encourage greater involvement throughout the instructional process. However, because the study did not include a control group, the findings should be interpreted as evidence of participation gains observed after the intervention rather than conclusive evidence of a direct causal effect. Future research employing more rigorous experimental designs is required to establish causal relationships with greater confidence.

RECOMMENDATIONS

For practitioners, the target-based javelin throwing game may serve as an alternative instructional strategy to promote active participation in PJOK lessons. Teachers are encouraged to develop and adapt similar game-based activities that align with students' developmental characteristics and learning needs.

Future studies should involve larger and more diverse samples, include control or comparison groups, and examine the effects of target-based javelin activities on additional educational outcomes such as learning motivation, academic achievement, motor skill development, and physical fitness. Conducting research across different educational levels and school contexts would also help determine the broader applicability of the findings. Furthermore, longer intervention periods are recommended to evaluate the sustainability of participation improvements over time.

ACKNOWLEDGMENT

The author gratefully acknowledges the support of all individuals and institutions that contributed to this study. Special appreciation is extended to the Principal of SMP Negeri 1 Gambut for granting permission to conduct the research, to the PJOK teacher for assistance throughout the data collection process, and to the students of Class VIII H who participated willingly and enthusiastically in the study.

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