

Improving Students' Long Jump Skills Through Game-Based Learning

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Abstract

Long jump learning in schools requires students to master the techniques of approach, take-off, flight, and landing in a coordinated manner. However, less varied learning activities may result in suboptimal student engagement and technical skill mastery. This study aimed to improve long jump skills through game-based learning. The study employed Classroom Action Research using the Kemmis and McTaggart model, consisting of planning, action, observation, and reflection. The research was conducted in two cycles, with one meeting in each cycle, involving Grade XII students of SMAN 1 Semarang. Data were collected through student activity observations and long jump skill tests. Game-based learning was implemented through modified games, including jumping over colored obstacles, graded-distance jumping competitions, and jumping relays. The results showed an increase in student learning activity across all observation indicators. The long jump skill test results indicated improvement in all six technical indicators from Cycle I as the pretest to Cycle II as the posttest, with score increases ranging from 1.13 to

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1.40 points. The highest improvement occurred in the approach/start position and body balance after landing, each increasing by 1.40 points. Thus, game-based learning demonstrated an improvement in students' long jump technical skills and learning activities. The educational implication of this study is that game-based learning can provide an active and enjoyable alternative for physical education instruction and support athletic skill development through structured game activities.

Keywords: Game-based learning; long jump skills; Physical Education; Classroom Action Research; senior high school students.

INTRODUCTION

Physical Education, Sports, and Health (PJOK) plays an important role in developing students' physical, motor, social, and affective competencies. In senior high school, athletics is one of the learning materials that requires students to integrate physical abilities with technical movement skills. Within the context of the Merdeka Curriculum, learning is expected to provide meaningful experiences, encourage active participation, and accommodate students' diverse learning needs (Darmawan & Kurnia, 2022; Rachman & Puspita, 2021). Therefore, PJOK learning needs to be designed not only to achieve technical mastery but also to create learning experiences that encourage students to actively participate in physical activities.

Long jump is an athletic event that requires the coordination of several movement phases, namely the approach, take-off, flight, and landing. Each phase contributes to the effectiveness and safety of the movement. The biomechanical characteristics of movement also indicate that the coordination of body segments and the sequence of movement are important factors in producing effective athletic performance (Irawan et al., 2025). In the context of school learning, understanding basic movement mechanics can help students perform technical movements more accurately. Nurulita (2025) emphasizes that a biomechanical approach can support students' understanding and mastery of basic long jump techniques. Similarly, Saputra and Suripto (2024) demonstrate that jump box and hurdle-jump exercises can be used to support improvement in long jump performance.

However, the teaching of long jump at the school level may encounter challenges when learning activities are dominated by repetitive technical exercises without sufficient variation. Such conditions may reduce students' enthusiasm and participation during learning. Game-based



learning provides an alternative by combining technical practice with structured and enjoyable activities. A systematic review of game-based learning and gamification in physical education indicates that game-oriented learning can support students' engagement and provide meaningful opportunities for physical activity (Game-Based Learning and Gamification in Physical Education: A Systematic Review, 2023). Kurniawan et al. (2025) also report that game-based learning can contribute to students' learning outcomes in physical education.

The use of games in athletics learning is particularly relevant because games can provide repeated movement practice while maintaining students' involvement. Intaprasong et al. (2025) found that a game-based learning program combined with station training can support enjoyment and physical fitness in school athletics. In addition, Junaedi and Marlina (2021) explain that cooperative and game-based learning can encourage interaction and participation among students. The competitive but enjoyable elements of games can also provide students with opportunities to practice movement without experiencing learning activities as overly rigid. Nugraha and Wibisono (2021) similarly emphasize the potential of game-based learning to create more active learning experiences in senior high school physical education.

Game-based learning can be further strengthened through modification of activities according to the technical characteristics of the skills being taught. Kurniawan and Suryani (2022) show the potential of modified games for improving students' long jump skills. For long jump learning, modified activities can focus on particular movement components, such as approach speed, take-off accuracy, body position during flight, and landing. The development of play activities specifically related to long jump also demonstrates that movement-based games can be adapted to facilitate students' practice of long jump techniques (Development of Hanging Style Long Jump Play Activities Based on the CGFU-PM515 Concept for Elementary Schools, 2024).

In addition to technical improvement, game-based learning can contribute to students' social participation. Saputro and Rahayu (2024), through a systematic literature review, highlight the relevance of cooperative learning models in physical education. Wardhani et al. (2025) also report that game-based learning in physical education can be associated with improvements in social interaction and physical fitness. These characteristics are relevant to school-based long jump learning because students can practice in groups, take turns, provide encouragement, and develop sportsmanship while completing movement tasks.



Student participation is also influenced by the teacher's role in creating an appropriate learning environment. Utami and Firmansyah (2021) emphasize the relationship between motivation, participation, and game-based physical education learning. In athletics learning, the teacher's role in encouraging students' interest and facilitating learning activities is also important (Prayadi & Putra, 2022). Consequently, game-based learning should not simply involve adding games to a lesson but should be designed systematically so that each activity remains connected to the intended learning objectives.

Assessment is another important component of PJOK learning. Authentic assessment allows teachers to observe students' performance during actual learning activities, while formative assessment can provide information about students' progress and areas that still require improvement (Ginancar & Astuti, 2021; Trilaksana & Yuniar, 2022). In the context of long jump learning, assessment can therefore focus not only on the final jumping distance but also on the quality of each technical phase, including the approach, take-off, flight, landing, and balance.

Based on these considerations, there is a need for learning activities that integrate long jump technique practice with active, enjoyable, and structured movement experiences. Although previous studies have examined game-based learning, modified games, cooperative learning, and long jump exercises, the present study focuses specifically on the implementation of three modified games—jumping over colored obstacles, graded-distance jumping competitions, and jumping relays—to improve both student learning activity and specific long jump technical skills at the senior high school level. The study therefore aims to improve the long jump skills and learning activity of Grade XII students through game-based learning in Physical Education at SMAN 1 Semarang.

LITERATURE REVIEW

Game-based learning in physical education refers to the use of structured play activities as a learning strategy to achieve specific physical and educational objectives. Games can provide students with opportunities to practice movements repeatedly while experiencing learning as an active and enjoyable process. Junaedi and Marlina (2021) explain that cooperative and game-based approaches can facilitate student interaction, while Nugraha and Wibisono (2021) emphasize the use of games to increase activity in physical education learning. More recent evidence also indicates that game-based learning can contribute to physical education learning outcomes (Kurniawan et al., 2025).



The effectiveness of game-based learning is closely related to the learning environment created through the activities. A systematic review of game-based learning and gamification in physical education identifies game-oriented approaches as relevant strategies for increasing students' engagement and supporting physical activity (Game-Based Learning and Gamification in Physical Education: A Systematic Review, 2023). In athletics, Intaprasong et al. (2025) demonstrate that game-based learning combined with station training can be used to enhance enjoyment and physical fitness. These findings support the use of structured games as an instructional strategy rather than merely as recreational activities.

In long jump learning, games can be modified to focus on specific technical components. Kurniawan and Suryani (2022) demonstrate the relevance of modified games to the development of long jump skills. Activities such as jumping over obstacles and jumping to different distances can provide repeated opportunities for students to practice take-off, body control, and landing. Saputra and Suripto (2024) similarly demonstrate the relevance of jump box and hurdle-jump exercises to long jump performance. Although these activities are not identical to the games implemented in the present study, they provide a basis for designing movement activities that emphasize specific technical components.

The technical aspects of long jump require coordination among several movement phases. A biomechanical perspective can help explain how movement sequences contribute to performance, particularly in basic long jump techniques (Nurulita, 2025). Irawan et al. (2025) also demonstrate the importance of biomechanical analysis in understanding the relationship among body segments and movement performance. In addition, play-based long jump activities can be developed to facilitate students' practice of specific movement patterns (Development of Hanging Style Long Jump Play Activities Based on the CGFU-PM515 Concept for Elementary Schools, 2024). These perspectives provide a theoretical basis for assessing long jump not only through final distance but also through observable technical indicators.

Game-based learning can also promote cooperation and social interaction. Saputro and Rahayu (2024) identify cooperative learning as a relevant approach in physical education because students can learn through interaction and shared activities. Wardhani et al. (2025) found that game-based physical education learning can improve social interaction and physical fitness. In addition, Utami and Firmansyah (2021) emphasize the role of motivation and participation in game-based physical education. These aspects are relevant to the present study because the



games require students to participate actively, cooperate within groups, follow rules, and demonstrate sportsmanship.

The teacher remains an important facilitator in the implementation of game-based learning. Prayadi and Putra (2022) emphasize the teacher's role in increasing students' interest and facilitating athletics learning. In the context of the Merdeka Curriculum, learning is expected to provide meaningful experiences while responding to students' different learning needs (Darmawan & Kurnia, 2022). Differentiated learning principles can also support the design of learning activities that provide opportunities for students with different levels of ability to participate meaningfully (Rachman & Puspita, 2021).

Assessment should accompany the learning process so that teachers can identify students' progress. Authentic assessment in PJOK can assess students' actual performance during learning activities (Ginanjari & Astuti, 2021). Formative observation can also provide information that helps teachers determine whether learning activities need adjustment (Trilaksana & Yuniar, 2022). Therefore, the present study assesses both student activity and specific technical components of long jump to obtain a more comprehensive picture of learning improvement.

The literature indicates that game-based learning, modified movement activities, cooperative learning, and authentic assessment can support physical education learning. However, the present study specifically examines the application of three structured modified games within classroom action research to improve long jump skills and student activity among Grade XII students at SMAN 1 Semarang. This focus provides a practical context for examining changes in both participation and observable technical performance across learning cycles.

RESEARCH METHOD

This study employed Classroom Action Research (CAR) using a cyclical process consisting of planning, action, observation, and reflection. The approach follows the general CAR procedure in which learning problems are addressed through systematic intervention and reflection across cycles (Zulkarnain & Handini, 2021). The research was conducted at SMAN 1 Semarang with 36 Grade XII students as participants. The intervention consisted of two cycles, with one meeting conducted in each cycle.

The planning stage involved preparing learning materials, lesson plans, observation instruments, long jump skill assessment instruments, and the modified games. The learning activities were designed to integrate long jump technical practice with game situations. The



activities were developed with consideration of the principles of active learning and the contextual implementation of PJOK learning (Darmawan & Kurnia, 2022).

Three modified games were implemented: jumping over colored obstacles, graded-distance jumping competitions, and jumping relays. The activities were designed to provide students with repeated practice of long jump movements while maintaining active participation. The selection of movement activities was informed by previous findings regarding modified games and long jump exercises (Kurniawan & Suryani, 2022; Saputra & Suropto, 2024). The teacher acted as facilitator by explaining the activities, demonstrating movements, organizing groups, observing students, and providing feedback during practice.

Student activity was observed using five indicators: (1) following instructions and game rules properly, (2) cooperating in game groups, (3) demonstrating courage to attempt jumping movements without hesitation, (4) demonstrating sportsmanship and discipline, and (5) participating actively and seriously during the games. Each indicator was assessed using a four-point scale.

Long jump skill was assessed through six technical indicators: (1) approach/running start position, (2) speed and accuracy of approach steps, (3) accuracy of take-off on the take-off board, (4) body position during flight, (5) foot position during landing, and (6) body balance after landing. These indicators were used to observe the development of students' technical performance in accordance with the emphasis on technical and movement-based long jump learning (Kurniawan & Suryani, 2022; Nurulita, 2025).

Data were collected through observation, long jump skill tests, and documentation. Observation was used to record student activity during the implementation of the games. Skill tests were used to assess students' long jump technique. Documentation consisted of photographs, videos, performance records, and field notes. The use of authentic performance observation was consistent with the principles of assessment in PJOK learning (Ginanjari & Astuti, 2021; Trilaksana & Yuniar, 2022). Documentation was also used to support the interpretation of changes observed during the learning process.

The quantitative data were analyzed descriptively by calculating the average score for each indicator in Cycle I and Cycle II and comparing the changes between the two cycles. Qualitative data from observations and field notes were analyzed descriptively to describe changes in student participation and learning behavior. Reflection at the end of each cycle was used to identify aspects requiring improvement in the subsequent cycle.



RESULT AND DISCUSSION

The implementation of game-based learning showed improvements in both student learning activity and long jump skills from Cycle I to Cycle II. The learning activities were implemented through three modified games, namely jumping over colored obstacles, graded-distance jumping competitions, and jumping relays. These activities were designed to provide repeated opportunities for students to practice long jump movements while encouraging active participation, cooperation, discipline, and confidence.

The observation results indicated an increase in all observed aspects of student activity. The five observed indicators were students' ability to follow instructions and rules, cooperation, courage to try, sportsmanship and discipline, and activity and seriousness during the learning process.

Table 1. Average Observation Scores of Student Activities in Cycle I and Cycle II

No.	Observation Indicator	Cycle I	Cycle II	Difference
1	Following instructions and game rules properly	2.47	3.80	1.33
2	Cooperating in game groups	2.60	3.83	1.23
3	Having the courage to attempt jumping movements without hesitation	2.67	3.73	1.07
4	Demonstrating sportsmanship and discipline	2.47	3.83	1.37
5	Being active and serious during the games	2.57	3.90	1.33

Table 1 shows that all indicators of student activity increased from Cycle I to Cycle II. The highest increase occurred in sportsmanship and discipline, which increased by 1.37 points, from 2.47 to 3.83. The indicators of following instructions and game rules and active and serious participation each increased by 1.33 points. Cooperation increased by 1.23 points, while courage to attempt jumping movements increased by 1.07 points. The improvement indicates that the game-based activities created a learning environment that encouraged students to become more actively involved in the learning process. In Cycle I, students were still adapting to the rules and activity procedures. Some students required additional explanations and teacher direction during the games. After reflection and adjustments to the learning process, students in Cycle II demonstrated greater familiarity with the activities and participated more consistently.



This finding is consistent with Junaedi and Marlina (2021), who explain that cooperative and game-based learning can encourage interaction and participation in physical education. The game structure in this study required students to participate in groups, take turns, follow activity rules, and support their peers. Consequently, learning activities did not only involve individual physical performance but also created opportunities for social interaction. The improvement in cooperation is also relevant to the findings of Saputro and Rahayu (2024), who emphasize the potential of cooperative learning models in physical education. Similar findings were reported by Wardhani et al. (2025), who found that game-based learning in physical education can support social interaction and physical fitness. In the present study, the relay and group-based activities required students to interact directly with their peers, making cooperation an integral part of the learning process.

The increase in active participation is also related to students' motivation during game-based learning. Utami and Firmansyah (2021) emphasize the relationship between motivation and student participation in game-based physical education. The use of varied activities in this study provided students with opportunities to perform movements repeatedly without relying solely on conventional technical drills. The competitive element in the graded-distance jumping game also provided an additional stimulus for students to remain involved in the activity. The findings are consistent with the broader evidence regarding game-based learning in physical education. A systematic review of game-based learning and gamification indicates that game-oriented approaches can support student engagement and participation in physical education (Game-Based Learning and Gamification in Physical Education: A Systematic Review, 2023). Kurniawan et al. (2025) also report the effectiveness of game-based learning in supporting physical education learning outcomes. In the present study, increased participation occurred simultaneously with improvement in students' long jump performance.

The long jump skill test also showed improvement across all assessed indicators. The six indicators consisted of approach or running start position, speed and accuracy of approach steps, accuracy of take-off on the take-off board, body position during the flight phase, foot position during landing, and body balance after landing.

Table 2. Average Long Jump Skill Test Scores of 36 Students in Cycle I and Cycle II

No.	Skill Indicator	Cycle I	Cycle II	Difference
1	Approach/running start position	1.83	3.23	1.40



2	Speed and accuracy of approach steps	2.27	3.43	1.17
3	Accuracy of take-off on the take-off board	2.00	3.13	1.13
4	Body position during the flight phase	1.97	3.27	1.30
5	Foot position during landing	2.03	3.33	1.30
6	Body balance after landing	1.87	3.27	1.40

Table 2 demonstrates that all six indicators of long jump technique improved from Cycle I to Cycle II. The increases ranged from 1.13 to 1.40 points. The largest improvement occurred in the approach/running start position and body balance after landing, each increasing by 1.40 points. The smallest improvement occurred in take-off accuracy, which increased by 1.13 points. The improvement in long jump skills can be related to the repeated movement practice provided through the modified games. Long jump requires students to coordinate several movement phases, including the approach, take-off, flight, and landing. Modified activities allowed students to practice these movement components repeatedly in situations that were more varied than a single conventional long jump attempt.

The finding supports Kurniawan and Suryani (2022), who examined the effectiveness of modified games for improving students' long jump skills. In the present study, the modification of the activities was directed toward specific movement experiences. Jumping over colored obstacles provided opportunities to practice take-off and body control, graded-distance jumping encouraged students to adjust their approach and jumping effort, while jumping relays provided repeated jumping experiences within a group activity.

The approach/running start position showed the largest increase, at 1.40 points. This improvement indicates that students demonstrated better control of their initial position before performing the jump. The approach phase is important because it prepares students to generate appropriate movement speed before take-off. A biomechanical approach to long jump learning emphasizes the importance of understanding the movement sequence and coordination of the basic technique (Nurulita, 2025). The speed and accuracy of approach steps increased by 1.17 points. This improvement indicates that students became better able to coordinate their approach steps before take-off. Repeated practice through game activities provided students with opportunities to experience variations in running speed and distance. The use of modified movement tasks is also consistent with the application of physical exercises such as jump box and hurdle-jump activities, which have been examined in relation to long jump performance (Saputra



& Suripto, 2024). The accuracy of take-off increased by 1.13 points. Although this was the smallest increase among the six indicators, the result still shows improvement between the two cycles. Take-off requires students to coordinate the final approach steps with the movement of the supporting leg and body. Repeated jumping activities allowed students to experience this coordination more frequently. From a movement-analysis perspective, coordinated body-segment movement is an important component of physical performance (Irawan et al., 2025). The body position during flight and foot position during landing each increased by 1.30 points. These improvements indicate that students demonstrated better control of their body position after take-off and during the landing phase. The development of play activities specifically related to long jump also demonstrates that game-based movement activities can be used to facilitate practice of long jump movement patterns (Development of Hanging Style Long Jump Play Activities Based on the CGFU-PM515 Concept for Elementary Schools, 2024). The body balance after landing showed one of the largest improvements, increasing by 1.40 points. Landing requires students to coordinate their legs and trunk while maintaining balance after contact with the ground. Through repeated jumping and landing activities, students obtained more opportunities to adjust their body position.

This result suggests that the game activities provided not only opportunities to perform the jump but also opportunities to experience and correct the landing movement. The improvement in both student activity and technical performance indicates that participation and movement practice occurred simultaneously during the intervention. The students were not merely practicing technical movements individually but were performing them within structured game situations. Intaprasong et al. (2025) similarly demonstrate the potential of game-based athletics activities to provide enjoyable opportunities for physical activity and skill development. The role of the teacher was also important during the implementation. The teacher provided explanations, demonstrations, feedback, and adjustments to the activities based on observations from Cycle I. This role is relevant to Prayadi and Putra (2022), who emphasize the importance of the PJOK teacher in encouraging students' interest and facilitating athletics learning. The improvement from Cycle I to Cycle II suggests that reflection and adjustment of the learning process were important components of the intervention. The implementation of the activities also provided opportunities for students with different levels of initial ability to participate. Students were able to perform the activities repeatedly within groups and adjust their movements through teacher feedback. This approach is consistent with the principles of learning



that respond to students' diverse needs within the Merdeka Curriculum (Darmawan & Kurnia, 2022; Rachman & Puspita, 2021).

Assessment of the learning process was conducted through observation and technical performance assessment. The use of specific technical indicators enabled the teacher to identify changes in individual components of long jump rather than relying only on the final jumping distance. This is consistent with the principles of authentic assessment in PJOK (Ginancar & Astuti, 2021). Formative observation also allowed the teacher to identify aspects that required improvement during the learning process (Trilaksana & Yuniar, 2022).

The results therefore demonstrate that game-based learning through three modified games was accompanied by improvement in both student activity and long jump skills. The increase in all five activity indicators and all six technical indicators indicates that the intervention provided opportunities for students to participate actively while practicing the technical components of long jump. These findings are in line with previous research concerning game-based learning, modified games, athletics learning, and physical education participation (Kurniawan et al., 2025; Kurniawan & Suryani, 2022; Wardhani et al., 2025). Although the results show improvement across the observed indicators, the findings should be interpreted within the context of the research design. The study involved one Grade XII class with 36 students and was conducted in two cycles, with one meeting in each cycle. Therefore, the findings describe changes within the specific learning context of SMAN 1 Semarang and should not be generalized beyond similar contexts without further research. Nevertheless, the results provide practical evidence that structured game-based activities can be integrated into long jump learning to create opportunities for repeated practice, active participation, cooperation, and development of technical skills.

CONCLUSION

Based on the results of the study, the implementation of game-based learning through jumping over colored obstacles, graded-distance jumping competitions, and jumping relays improved both student learning activity and long jump skills among Grade XII students at SMAN 1 Semarang. Improvements in student activity were observed across all five indicators, namely following instructions and game rules, cooperation, courage to attempt jumping movements, sportsmanship and discipline, and active participation.



Improvements were also found across all six long jump technical indicators, including approach/running start position, speed and accuracy of approach steps, take-off accuracy, body position during flight, foot position during landing, and body balance after landing. The increase in skill scores ranged from 1.13 to 1.40 points, with the largest increases occurring in approach/running start position and body balance after landing, each increasing by 1.40 points.

These findings indicate that structured game-based activities can provide opportunities for repeated movement practice while creating an active, enjoyable, and collaborative learning environment. Therefore, game-based learning can be used as an alternative instructional strategy for teaching long jump in senior high school PJOK.

This study was limited to one Grade XII class consisting of 36 students and two cycles, with one meeting in each cycle. The study also focused specifically on long jump skills. Further research may examine game-based learning with larger and more diverse groups, longer intervention periods, additional cycles, and other athletic or movement skills.

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