Locomotor Movement Learning Based On Small Games For Elementary School Students

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ABSTRACT

Physical Education, Sports, and Health (PJOK) plays an important role in developing students' fundamental movement skills, particularly locomotor movements that serve as the foundation for more complex physical activities. However, in many elementary schools, students' learning outcomes in basic locomotor movements remain relatively low due to limited variation in teaching strategies and low student engagement during learning activities. Therefore, innovative learning approaches are needed to create more active and enjoyable learning environments. This study aimed to improve elementary school students' locomotor movement learning outcomes through the implementation of small games–based learning. This research employed the Classroom Action Research (CAR) method using the Kemmis and McTaggart model, which consists of four stages: planning, action, observation, and reflection. The study was conducted at SD N 159/IX Suka Maju, involving 23 third-grade students as research subjects. Data collection techniques included classroom observations and locomotor movement skill tests, while data analysis was carried out using descriptive quantitative methods by calculating the percentage of student learning mastery based on the Minimum Completion Criteria (KKM). The results showed a significant improvement in students' locomotor learning outcomes after the implementation of small games–based learning. In the pre-action stage, only 9 students (39.1%) achieved learning mastery, while 14 students (60.9%) had not yet met the completion criteria. After the intervention, the number of students achieving mastery increased to 19 students (82.6%), while only 4 students (17.4%) remained below the completion criteria. These findings indicate that the use of small games in locomotor learning can increase student participation and improve learning outcomes. Therefore, small games–based locomotor movement learning can serve as an effective alternative instructional strategy for improving elementary school students' fundamental locomotor skills.

AUTHORS' CONTRIBUTION

A. Conception and design of the study;
B. Acquisition of data;
C. Analysis and interpretation of data;
D. Manuscript preparation;
E. Obtaining funding

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INTRODUCTION

Physical education is an essential component of the educational system that aims to develop students' physical competence, motor skills, health awareness, and social

values through structured physical activities. Within the school curriculum, physical education not only focuses on physical fitness but also contributes to cognitive development, emotional maturity, and social interaction among students (Bailey et al., 2009; Kirk, 2019; Ward, 2020). At the elementary school level, physical education plays a strategic role in forming the foundation of lifelong physical activity and promoting healthy lifestyles among children (Haris et al., 2025; Lubans et al., 2019).

One of the fundamental objectives of physical education for elementary school students is the development of fundamental movement skills (FMS). Fundamental movement skills are basic motor competencies that serve as the foundation for more complex physical and sport-specific skills later in life (Goodway et al., 2019; Logan et al., 2018). These skills are typically categorized into three main groups: locomotor skills, non-locomotor skills, and manipulative skills. Locomotor movements refer to movements that enable the body to travel from one location to another, such as walking, running, jumping, hopping, and skipping (Hanief & Sugito, 2015; Barnett et al., 2016). Mastery of locomotor skills is crucial because it supports the development of coordination, balance, agility, and muscular strength in children (Robinson et al., 2015; Stodden et al., 2017).

However, numerous studies indicate that many elementary school students still demonstrate low levels of fundamental movement competence. Limited opportunities for active movement, insufficiently structured learning strategies, and teacher-centered instructional approaches often hinder the optimal development of children's motor skills (Logan et al., 2018; Ward, 2020; Hardy et al., 2020). When physical education learning emphasizes instruction rather than active participation, students receive fewer opportunities to practice movement skills, which ultimately affects their motor development and physical fitness (Barnett et al., 2016; Robinson et al., 2015).

The development of locomotor movement skills during childhood is highly dependent on the learning experiences provided in physical education classes. Effective instruction should provide active, enjoyable, and meaningful learning experiences that align with children's developmental characteristics (Gallahue et al., 2018; Goodway et al., 2019). In this context, teachers play a vital role in designing learning activities that stimulate students' participation and encourage them to engage in movement exploration. Therefore, innovative teaching strategies are necessary to enhance locomotor skill development in elementary school physical education.

Recent research in physical education has increasingly emphasized the importance of student-centered learning approaches that actively involve students in movement-based activities. One of the most widely recommended strategies is the game-based learning approach, which integrates play elements into instructional activities to enhance student engagement and motivation (Hastie & Casey, 2014; Casey et al., 2021). Game-based learning encourages active participation, collaborative interaction, and experiential learning, which are essential for developing motor competence in children (Light, 2019; Harvey & Jarrett, 2018).

In the context of elementary school physical education, game-based learning aligns closely with the developmental characteristics of children who naturally enjoy playing,

exploring, and engaging in dynamic activities (Dyson et al., 2020). Through play-based activities, students can practice movement skills repeatedly in a fun and motivating environment, which significantly enhances skill acquisition and retention (Lubans et al., 2019; Logan et al., 2018).

One form of game-based learning that has attracted considerable attention is small games. Small games are simplified games with modified rules, limited playing areas, and manageable group sizes, allowing students to engage more frequently in movement activities (Nurkusuma, 2017; Harvey & Jarrett, 2018). These games are particularly suitable for elementary school students because they promote active participation while maintaining an enjoyable learning atmosphere.

Several empirical studies have demonstrated the effectiveness of game-based learning in improving students' motor skills and physical activity levels. Research by Robinson et al. (2015) showed that structured play-based activities significantly improved children's fundamental movement skills. Similarly, Lubans et al. (2019) found that physical activity programs incorporating game elements increased children's motor competence and physical fitness. Other studies also indicate that game-based learning approaches improve student motivation, engagement, and enjoyment during physical education lessons (Dyson et al., 2020; Casey et al., 2021).

In Indonesia, studies related to physical education innovation have also highlighted the effectiveness of game-based approaches in improving students' movement skills. Research by Safa'at et al. (2019) revealed that movement education models could enhance locomotor abilities among elementary school students. Additionally, traditional games have been shown to improve both motor skills and cooperative behavior in children (Rahul et al., 2025; Aini & Husna, 2025). These findings emphasize the potential of play-based learning strategies to improve motor skill development in elementary school physical education.

Despite the growing body of literature on game-based learning in physical education, several gaps remain in current research. First, many previous studies have focused on general game-based learning models or traditional games, rather than specifically examining small games as structured learning strategies for locomotor movement development. While traditional games provide cultural and social benefits, small games offer a more flexible and adaptable instructional format that can be tailored to specific learning objectives. Second, previous studies often emphasize overall fundamental movement skills rather than focusing specifically on locomotor skills. Although locomotor movements are a crucial component of motor development, research investigating targeted interventions for improving locomotor competence in elementary school students remains relatively limited (Logan et al., 2018; Hardy et al., 2020). Third, differences in school environments, learning facilities, and student characteristics may influence the effectiveness of instructional strategies in physical education. Many studies have been conducted in different contexts, making it necessary to examine the implementation of small games in specific educational settings to determine their effectiveness in improving locomotor learning outcomes.

Furthermore, there is still limited empirical evidence exploring how structured small-game-based activities can systematically improve locomotor movement learning in elementary school students. Understanding the effectiveness of this approach is essential for developing innovative physical education strategies that promote active participation and meaningful movement learning experiences.

Based on the research gaps identified above, this study aims to examine the implementation of locomotor movement learning based on small games for elementary school students and to determine its effectiveness in improving students' locomotor movement skills. Specifically, the study investigates how small-game-based learning activities can enhance students' participation, engagement, and locomotor skill development during physical education lessons. The novelty of this research lies in the integration of small games as a structured learning strategy specifically designed to improve locomotor movement competence among elementary school students. Unlike previous studies that focus on general game-based learning or traditional games, this study emphasizes the systematic use of small games as a pedagogical approach to support motor skill acquisition. Additionally, this study contributes to the development of innovative physical education learning models that align with students' developmental characteristics and promote active, enjoyable learning environments. By examining the effectiveness of small-game-based locomotor learning, this research provides empirical evidence that can support the development of more engaging and effective physical education teaching strategies.

In summary, the development of locomotor movement skills is a crucial component of elementary school physical education because it forms the foundation for children's future physical activity and sport participation. However, many students still demonstrate low levels of locomotor competence due to limited opportunities for active and engaging learning experiences. Game-based learning approaches, particularly small games, offer promising strategies to address these challenges by providing enjoyable and meaningful movement experiences for students.

Nevertheless, empirical studies specifically examining the role of small games in locomotor movement learning remain limited. Therefore, this study seeks to investigate the implementation of small-game-based locomotor learning in elementary school physical education and its impact on students' locomotor skill development. The findings of this study are expected to contribute to the advancement of innovative teaching strategies in physical education and support the improvement of motor skill development among elementary school students.

METHODS

This study employed the Classroom Action Research (CAR) approach to improve students' locomotor movement skills through the implementation of small game–based learning activities in physical education classes. Classroom Action Research is widely used in educational settings because it allows teachers and researchers to

systematically examine classroom practices, implement improvements, and evaluate their impact on student learning outcomes (Kemmis et al., 2014; Burns, 2019). In the context of physical education, CAR is particularly effective for improving instructional strategies and enhancing students' motor skill development through iterative cycles of planning, action, observation, and reflection (Casey et al., 2018; Dyson et al., 2020). This approach also enables educators to adapt teaching methods to the developmental characteristics of elementary school students while simultaneously improving the quality of learning processes (Ward, 2020).

The research adopted the Kemmis and McTaggart action research model, which consists of four main stages: planning, action, observation, and reflection (Kemmis et al., 2014). The study was conducted at SD N 159/IX Suka Maju, involving 23 third-grade elementary school students as research participants. The research was implemented in two cycles, and each cycle consisted of a series of locomotor movement learning activities designed using a small games approach. The selection of elementary school students as research subjects was based on the developmental stage of children, in which the acquisition of fundamental movement skills, particularly locomotor skills, is crucial for supporting long-term physical activity participation and motor competence (Goodway et al., 2019; Logan et al., 2018).

In the planning stage, the researchers designed learning scenarios and prepared instructional materials related to locomotor movement skills, including walking, running, hopping, and jumping. These locomotor activities were integrated into various small games, which were structured with simple rules, limited playing areas, and cooperative participation to encourage active movement among students. Game-based learning has been widely recognized as an effective pedagogical strategy in physical education because it enhances student engagement, promotes repeated motor practice, and creates meaningful movement experiences (Harvey & Jarrett, 2018; Lubans et al., 2019). The planning stage also included the preparation of lesson plans, observation sheets, locomotor skill assessment rubrics, and learning media to support the implementation of small game activities.

The action stage involved the implementation of small game–based locomotor learning activities during Physical Education (PJOK) lessons. Students participated in a variety of movement-based games designed to stimulate locomotor skill development while maintaining a fun and motivating learning environment. Previous research indicates that integrating play into physical education instruction can significantly improve children's motor skill acquisition and physical activity levels (Dyson et al., 2020; Robinson et al., 2015). During this stage, the teacher facilitated learning activities while ensuring that all students actively participated in the movement tasks embedded within the small games.

The observation stage was conducted simultaneously with the learning implementation. Observations focused on both teacher performance and student participation during the learning process. Observational data were collected using structured observation sheets to evaluate the effectiveness of the instructional process

and the level of student engagement in the activities. Observation-based evaluation is considered an essential component of classroom action research because it provides empirical evidence regarding the implementation of teaching strategies and their influence on student learning outcomes (Burns, 2019; Casey et al., 2018).

Following the observation stage, the reflection stage was carried out to evaluate the results obtained in each cycle. Reflection involved analyzing the strengths and weaknesses of the learning process and identifying aspects that needed improvement in the subsequent cycle. Through reflective evaluation, researchers and teachers can systematically refine instructional strategies to optimize learning effectiveness (Kemmis et al., 2014; Ward, 2020).

Data collection techniques in this study consisted of observations and locomotor movement skill tests. Observations were conducted to analyze teacher and student activities during the learning process, while locomotor skill tests were used to measure students' learning outcomes in basic locomotor movement materials. The instruments used in this research included learning activity observation sheets and a locomotor movement skill assessment rubric, which evaluated students' ability to perform basic locomotor movements accurately and effectively.

The collected data were analyzed using descriptive quantitative analysis, including the calculation of mean scores and the percentage of students achieving the Minimum Mastery Criteria (KKM). This analysis was used to determine the improvement in student learning outcomes from pre-action conditions to Cycle I and Cycle II following the implementation of small game–based locomotor learning activities. Descriptive analysis is frequently used in classroom action research to evaluate the effectiveness of instructional interventions and identify patterns of learning improvement (Creswell & Creswell, 2018; Fraenkel et al., 2019).

RESULTS AND DISCUSSION
Result

This section presents the findings obtained from the implementation of locomotor movement learning based on small games for third-grade students at SD Negeri 159/IX Suka Maju. The research findings were obtained through classroom observations, documentation of student learning outcomes, and field notes recorded during the implementation of the learning actions in each cycle of the Classroom Action Research (CAR). The data were analyzed using descriptive quantitative analysis, focusing on the comparison of student learning outcomes before and after the implementation of the small games–based learning model. The analyzed indicators included the average class score and the percentage of students achieving learning mastery according to the Minimum Completion Criteria (KKM) established by the school, which was set at 70. The results of the analysis were presented through tables, graphs, and descriptive explanations to provide a clear overview of the improvement in students' locomotor movement learning outcomes.

Initial Condition (Pre-Action Stage)

The pre-action stage was conducted to identify students' initial abilities in performing basic locomotor movements, including walking, running, and jumping. At this stage, the learning process still used conventional teaching methods, where the teacher explained the movement techniques and students practiced them with limited variation in activities. Based on the initial observation results, many students showed low participation and limited movement practice opportunities, which affected their locomotor skill mastery. The assessment of students' locomotor learning outcomes indicated that many students had not yet achieved the Minimum Completion Criteria. Table 1 presents the results of the initial assessment before the implementation of the small games–based learning model.

Table 1.
Student Learning Outcomes in the Pre-Action Stage

Category	Number of Students	Percentage
Achieved KKM (≥70)	9	39.1%
Not Achieved KKM (<70)	14	60.9%
Total	**23**	**100%**

The data indicate that only 9 out of 23 students (39.1%) achieved the Minimum Completion Criteria, while 14 students (60.9%) had not yet achieved learning mastery. These results suggest that students' locomotor movement abilities were still relatively low and required improvements through more engaging and student-centered learning strategies.

Learning Outcomes After the Implementation of Small Games (Post-Action)

After identifying the initial condition, the researcher implemented small games–based locomotor learning through two cycles of classroom action research. The learning activities were designed to integrate locomotor movements into various simple and enjoyable games, enabling students to practice movements repeatedly in an engaging learning environment.

The implementation of small games significantly increased students' participation during physical education lessons. Students became more active and enthusiastic in performing locomotor movements because the activities were presented in the form of games rather than conventional drills. Table 2 presents the results of students' locomotor learning outcomes after the implementation of the small games–based learning model.

Table 2.
Student Learning Outcomes After the Action

Category	Number of Students	Percentage
Achieved KKM (≥70)	19	82.6%
Not Achieved KKM (<70)	4	17.4%
Total	**23**	**100%**

The results indicate that 19 students (82.6%) achieved the Minimum Completion Criteria after the implementation of the small games–based learning approach. Meanwhile, only 4 students (17.4%) had not yet achieved learning mastery.

Comparison of Learning Outcomes

The improvement in locomotor learning outcomes can be clearly observed by comparing the pre-action and post-action conditions. Figure 1 illustrates the comparison of the number of students who achieved learning mastery before and after the implementation of small games–based learning.
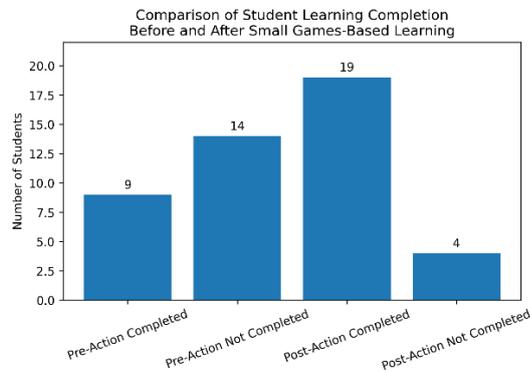

Figure 1.
Comparison of Locomotor Learning Outcomes

Based on the comparison graph, there was a significant improvement in the number of students who achieved learning mastery. In the pre-action stage, only 9 students completed the learning requirements, while 14 students had not yet achieved the Minimum Completion Criteria. After the implementation of small games–based learning, the number of students achieving mastery increased to 19 students, while the number of students who had not yet achieved mastery decreased to 4 students.

Improvement in Learning Mastery Percentage

In addition to the increase in the number of students achieving mastery, there was also a significant improvement in the percentage of learning completion.
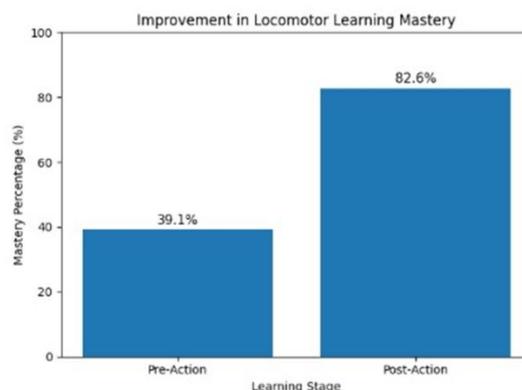

Figure 2.
Improvement in Locomotor Learning Mastery

The results show that the percentage of student learning mastery increased from 39.1% to 82.6% after the implementation of the small games–based learning model. This means that there was an increase of 43.5% in student learning mastery.

Based on the analysis of the research data, the implementation of small games–based locomotor learning resulted in a clear improvement in students' locomotor

movement learning outcomes. The increase can be observed from both the number of students achieving learning mastery and the percentage of learning completion. In the pre-action stage, only 9 out of 23 students met the Minimum Completion Criteria, while 14 students had not yet achieved mastery. After the implementation of small games–based learning activities, the number of students achieving mastery increased to 19 students, while the number of students who had not yet achieved mastery decreased to 4 students. Furthermore, the percentage of learning mastery increased significantly from 39.1% in the pre-action stage to 82.6% in the post-action stage, indicating a 43.5% improvement in learning completion.

These findings demonstrate that the use of small games in locomotor movement learning can create a more engaging learning environment, increase student participation in physical activities, and significantly improve students' mastery of basic locomotor skills. The results also indicate that integrating game elements into physical education instruction is an effective strategy for enhancing elementary school students' motor skill development.

Discussion

The results of this study demonstrate that the implementation of locomotor movement learning based on small games significantly improved the learning outcomes of third-grade students at SD Negeri 159/IX Suka Maju. This improvement is reflected in both the increase in the number of students achieving learning mastery and the rise in the percentage of learning completion between the pre-action and post-action stages. Initially, only 9 students (39.1%) met the Minimum Completion Criteria (KKM), while after the implementation of small games–based learning, the number of students achieving mastery increased to 19 students (82.6%). This finding indicates that integrating game-based activities into physical education lessons can significantly enhance students' engagement and learning outcomes in locomotor movement skills.

The improvement in learning outcomes can be explained by the characteristics of small games–based learning, which provide a more active, engaging, and enjoyable learning environment. Elementary school students naturally enjoy play activities and tend to learn more effectively when learning is integrated with playful experiences. Play-based learning allows students to explore movements freely while simultaneously practicing essential motor skills (Goodway et al., 2019; Dyson et al., 2020). According to Lubans et al. (2019), physical activity presented in the form of games can increase student participation in learning activities while simultaneously improving motor skill development and physical fitness. This suggests that incorporating games into physical education instruction can enhance students' understanding of locomotor movements in a more meaningful and enjoyable way. Furthermore, small games-based learning provides opportunities for repeated movement practice, which is a critical factor in motor skill development. In the context of physical education, repetition plays a fundamental role in strengthening neuromuscular coordination and improving movement efficiency (Logan et al., 2018; Robinson et al., 2015). Through small games,

students repeatedly perform locomotor movements such as walking, running, jumping, and hopping while participating in dynamic and challenging activities. This repetitive yet enjoyable practice enables students to refine their movement patterns and improve their locomotor competence. As emphasized by Stodden et al. (2017), continuous practice of fundamental movement skills during childhood is essential for developing motor competence and promoting long-term physical activity participation.

The findings of this study also support the concept of active learning in physical education, which emphasizes direct student involvement in learning activities. Active learning approaches encourage students to engage physically and cognitively in learning tasks, thereby enhancing both skill acquisition and learning motivation (Casey et al., 2021; Ward, 2020). In this study, small games allowed students to actively participate in locomotor activities rather than passively following teacher instructions. This aligns with the argument of Haerens et al. (2015) that physical education learning environments that promote active participation and student-centered activities can significantly improve motor skill development and overall learning outcomes.

Another important factor contributing to the improvement in learning outcomes is the motivational effect of game-based learning. Motivation plays a crucial role in students' willingness to participate in physical activities and practice movement skills. When learning activities are enjoyable and engaging, students are more likely to participate actively and sustain their involvement throughout the lesson (Ntoumanis et al., 2021; Deci & Ryan, 2020). Small games create a learning atmosphere that is both enjoyable and competitive in a positive sense, encouraging students to challenge themselves and explore their physical abilities. As noted by Pangrazi and Beighle (2019), enjoyable physical education experiences can increase students' interest in physical activity and contribute to the development of lifelong active lifestyles. The improvement observed in this study is also consistent with the theoretical framework of fundamental movement skills (FMS) development, which emphasizes the importance of structured practice opportunities in childhood. Fundamental movement skills, including locomotor movements, form the foundation for the development of more complex sport-specific skills (Barnett et al., 2016; Hardy et al., 2020). When students receive sufficient opportunities to practice these basic movements through engaging activities, their motor competence can develop more effectively. Small games provide such opportunities by integrating locomotor skills into structured play activities that require students to move frequently and interact with their peers.

The results of this study are also supported by various empirical studies that highlight the effectiveness of game-based learning in physical education. For example, research conducted by Al Mubarroh et al. (2024) demonstrated that game-based learning significantly improved elementary school students' locomotor movement skills, with learning completion increasing from 44% in the first cycle to 98% in the second cycle. Similarly, Harvey and Jarrett (2018) found that modified games can enhance student engagement and facilitate the development of fundamental movement skills in physical education classes. These findings reinforce the argument that game-based approaches

are highly effective in promoting active participation and improving motor learning outcomes among young learners. In addition, several recent studies emphasize that play-oriented physical education learning environments contribute to both physical and psychosocial development among children. Research by Dyson et al. (2020) indicates that cooperative and game-based learning strategies can improve not only motor skills but also social interaction and teamwork among students. Likewise, Casey et al. (2021) highlight that student-centered pedagogical models, including game-based learning, promote deeper engagement and improve students' learning experiences in physical education.

The findings of this study also have important implications for teaching practices in elementary school physical education. Traditional teaching methods that rely heavily on demonstrations and repetitive drills may limit students' opportunities for active participation and exploration of movement skills. In contrast, small games offer a more dynamic and interactive learning environment where students can develop locomotor skills while enjoying the learning process. According to Light (2019), integrating play into physical education instruction can transform learning environments into more meaningful and engaging experiences for students. Moreover, the use of small games supports the development of holistic learning experiences, as students simultaneously develop physical, cognitive, and social skills during gameplay. When students engage in games, they must make quick decisions, coordinate their movements, and interact with their peers, which contributes to the development of both motor competence and social skills (Harvey & Jarrett, 2018; Dyson et al., 2020). This holistic development aligns with the broader objectives of physical education, which aim not only to improve physical fitness but also to foster cooperation, sportsmanship, and positive attitudes toward physical activity (Kirk, 2019; Bailey et al., 2020).

Overall, the findings of this study confirm that small games–based locomotor learning is an effective strategy for improving elementary school students' locomotor movement skills. The integration of play into physical education instruction increases student engagement, provides opportunities for repeated movement practice, and creates a supportive learning environment that encourages students to actively participate in physical activities. These factors collectively contribute to the significant improvement in students' learning outcomes observed in this study. Therefore, it can be concluded that implementing small games as a learning strategy in locomotor movement instruction has a positive impact on student learning outcomes. Learning activities designed in the form of games not only enhance student engagement but also help students better understand and practice locomotor movements in meaningful contexts. Consequently, the use of small games can serve as an effective and innovative alternative learning strategy for improving the quality of physical education learning in elementary schools.

CONCLUSION

Based on the results of this classroom action research, it can be concluded that the implementation of locomotor movement learning based on small games has a positive and significant impact on improving the learning outcomes of elementary school

students. The findings of the study demonstrate that integrating small games into physical education learning can enhance students' engagement, participation, and mastery of basic locomotor movement skills.

Empirically, the improvement in student learning outcomes is clearly reflected in the increase in the number and percentage of students achieving the Minimum Completion Criteria (KKM). In the pre-action stage, only 9 out of 23 students (39.1%) successfully met the required learning mastery criteria, while the remaining 14 students (60.9%) had not yet achieved the expected level of competence in performing basic locomotor movements such as walking, running, and jumping. These results indicated that students' initial locomotor movement abilities were relatively low and required improvement through more engaging and student-centered instructional strategies.

After the implementation of small games–based locomotor learning, there was a substantial improvement in students' learning outcomes. The number of students who achieved learning mastery increased to 19 students (82.6%), while only 4 students (17.4%) remained below the Minimum Completion Criteria. This means that there was an overall increase of 43.5% in learning mastery, indicating that the learning intervention effectively enhanced students' locomotor movement skills.

Conceptually, these findings support the view that physical education learning that integrates play-based activities can create a more active, enjoyable, and meaningful learning environment for elementary school students. Small games provide opportunities for repeated movement practice in a fun and motivating context, allowing students to develop locomotor skills while simultaneously increasing their enthusiasm for participating in physical activities.

Therefore, it can be concluded that small-game-based locomotor movement learning is an effective alternative instructional strategy for improving students' basic locomotor movement skills in elementary school physical education. The integration of game elements into learning activities not only enhances student engagement but also contributes to more effective motor skill development. Consequently, physical education teachers are encouraged to incorporate small games into their teaching strategies to create more dynamic and student-centered learning environments that support the development of fundamental movement skills among young learners.

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Finally, the authors sincerely hope that the results of this study can contribute to the development of innovative physical education learning strategies, particularly in improving elementary school students' fundamental movement skills. It is also hoped that the findings of this research will provide useful insights for teachers, educators, and researchers in designing engaging, effective, and student-centered physical education learning models based on game activities.

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