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How Fundamental Movement Skills Enhance Physical Literacy? Literature Review with Digital Approach

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ABSTRACT

Physical literacy is the main goal of physical education in elementary schools, with fundamental movement skills as the foundation. However, information supporting the relationship between these two constructs and effective pedagogical techniques is still fragmented. The purpose of this systematic review aimed to find, analyze, and synthesize research findings on fundamental movement skills, motor competencies, and physical literacy in physical education in elementary schools. A qualitative systematic review design in accordance with PRISMA guidelines was employed. Data were retrieved from the Scopus database on February 14, 2026, using relevant keywords such as physical literacy, fundamental movement skills, motor competence, and primary education. After screening and eligibility determination, eight peer-reviewed English-language scientific articles were included and evaluated descriptively. The findings consistently showed a significant positive relationship between fundamental movement skills and physical literacy, indicating that children with higher motor skills tend to be more motivated, confident, and actively participate in physical activities. Intervention programs, such as physical education enriched with physical literacy, multi-method teaching techniques, and scheduled physical activity programs, have been shown to significantly improve motor skills, engagement, and learning outcomes. The implementation of student-centered teaching strategies and the improvement of teachers' pedagogical skills are essential for enhancing motor development, encouraging lifelong participation in physical activity, and optimizing the effectiveness of physical education programs.

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INTRODUCTION

Physical literacy is an important concept in physical education that focuses on developing physical abilities, motivation, self-confidence, and individual knowledge and understanding so that individuals can participate in physical activities throughout their lives (Edwards et al., 2017). Fundamental Movement Skills (FMS) or Motor Competence is one of the most important components of physical literacy because it provides the foundation for children to perform various movement tasks efficiently (Tyler et al., 2018). Locomotor skills such as running and jumping, as well as manipulative or object control skills such as throwing, catching, and controlling a ball, are examples of fundamental movement skills. These skills serve as essential prerequisites that students must develop before progressing to more advanced sport specific skills.

The development of students' physical literacy is supported by fundamental movement skills and motor competencies (Cairney et al., 2019). Running, jumping, throwing, and catching are examples of fundamental movement skills that are an important foundation for the development of more complex motor skills. However, research by Lawson et al., (2021) shows that the physical literacy of elementary school students has not reached its maximum potential, especially in terms of fundamental movement skills. According to Invernizzi et al., (2019), integrated learning strategies in physical education can improve motor skills, physical activity, and student engagement in learning. In addition, more than half of elementary school students still have relatively low fundamental movement skills even though they have a fairly good level of physical activity (Gu et al., 2019).

Several physical education interventions have been developed to improve fundamental movement skills and physical literacy in elementary school children. Physical Education Physical Literacy (PEPL)-based interventions significantly improve students' ability to control objects, motivation, and participation in physical activities (Telford et al., 2021). The inclusion of physical literacy-based interventions in physical education can improve students' learning capacity, movement skills, and participation in physical activities (Stoddart et al., 2023; Romero-Martínez et al., 2025). In addition, organized physical education and physical activity programs have been shown to improve children's social-emotional growth, physical literacy, and fundamental movement skills (Huang & Choosakul, 2025; Luptáková dkk., 2025).

Although numerous studies have demonstrated the value of motor competence, fundamental movement skills, and physical literacy in physical education in elementary schools, the findings of these studies are still scattered across different methodologies, research designs, and focuses. Physical education teachers still have a limited understanding of the concept of physical literacy, which makes it difficult to implement teaching that facilitates the optimal development of physical literacy (Irmansyah et al., 2025). Therefore, to provide a deeper understanding of the development of physical literacy, fundamental movement skills, and motor competence in physical education in elementary schools, this condition suggests the need for systematic synthesis of various studies.

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Therefore, this systematic review aimed to identify, evaluate, and synthesize research findings on motor skills, fundamental movement skills, and physical literacy in the context of physical education for elementary school students. The finding of this systematic review is expected to provide a comprehensive overview of how fundamental movement skills contribute to the development of students' physical literacy and serve as a basis for creating more effective physical education lessons that are appropriate for the developmental stage of students.

METHODS

Study Design

This study identified and synthesized research findings on motor competence, fundamental movement skills, and physical literacy in physical education in elementary schools using a qualitative approach and systematic review design. To ensure systematic, transparent, and reliable procedures in each phase of identification, screening, eligibility, and inclusion, this review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The Scopus database was used as a primary data source because it contains credible scientific publications that have undergone a peer-review process related to the research topic. The selected articles were then analyzed using descriptive qualitative analysis to identify, compare, and synthesize the main findings related to the development of physical literacy and fundamental movement skills in elementary school students.

Study Procedures

Data were collected on February 14, 2026, from previous research publications using the keywords “Physical literacy” AND “Fundamental movement skills” OR “Motor competence” AND “Physical education” AND “Elementary school” OR “Primary school” AND “Student.” The literature search was conducted using the Scopus database.

The inclusion criteria for this study were documents written in the form of articles and in English. The use of English was required to prevent misunderstandings during the review process. This analysis excluded documents that were not written in the form of articles and in English. The selection of publications relevant to the keywords was also important to ensure that the results of the literature review were consistent with the research objectives. The screening process was carried out through the stages of identification, screening based on abstracts and titles, feasibility testing by reading the full text, and final inclusion in accordance with PRISMA guidelines. The main findings related to physical literacy and fundamental movement skills in elementary school physical education were identified through a qualitative analysis of articles that met the requirements, which were then identified based on the author, year, purpose, method, and findings of the study.

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RESULTS

The result of PRISMA screening process

The screening process, conducted using the PRISMA flow chart, resulted in 14 documents identified in the database based on the keywords used (Figure 1). The results were screened again to separate documents in the form of articles not published in English. An eligibility process was carried out to screen the articles used in the literature review. The final result was 8 articles that were most frequently cited and relevant.

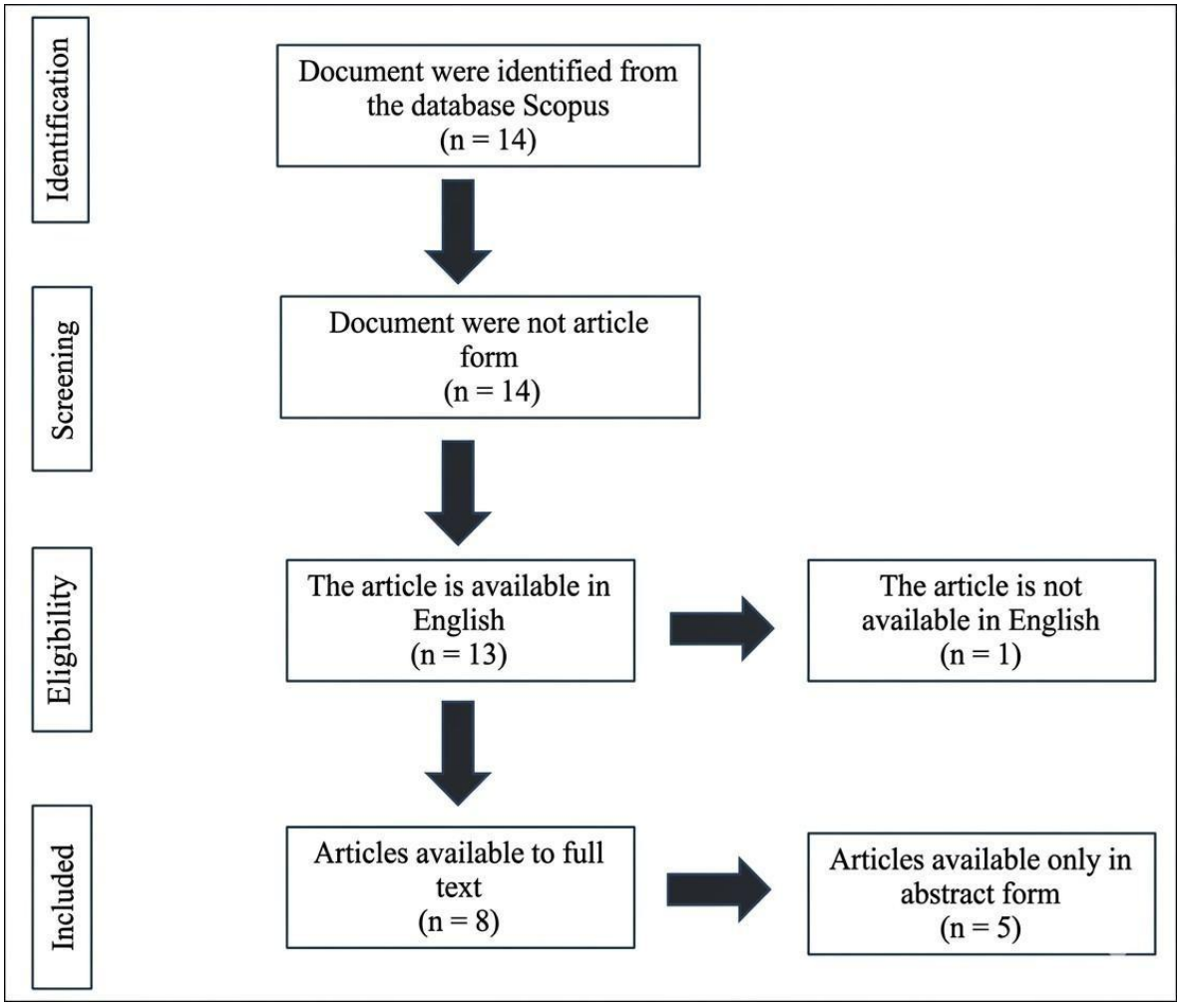


Figure 1. PRISMA flowchart of the article selection process

Literature Review

In this section, a literature review was conducted using relevant articles with the highest number of citations (Table 1). Based on the screening results using predetermined keywords, eight articles were selected for use in the literature review. This literature review served as the basis for researchers to obtain findings in line with the objectives of this study.

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***Tabel 1**. Literature Review*

Author	Total Cited	Research Purpose	Method	Result
Invernizzi et al., (2019)	89	To investigate the effectiveness of an integrated approach mainly based on integration of multi-teaching styles and active reflection (MTA) on the fitness level, motor competence, enjoyment, self-perception, amount of physical activity (PA), and children's perception of PE, in Italian primary school children.	Quasi-experimental	Compared to traditional teaching approaches, these results show that the Multi-Teaching Approach (MTA), which combines various teaching styles, is more effective when applied in physical education classes. Students taught using this approach experienced improvements in motor skills, fitness, enjoyment of exercise, and the amount of extracurricular physical activity over a 12-week period. They also participated more actively in class and expressed greater satisfaction with the educational process. However, there were no significant changes in self-perception.
Telford et al., (2021)	31	To evaluate the impact of the multi-component Physical Education Physical Literacy (PEPL) intervention, designed to improve students' fundamental movement skill, perceived physical abilities and level of physical activity.	Experimental Study	The study findings indicate that elementary school students' physical literacy improved as a result of the 33-week PEPL intervention. The program showed a tendency to increase moderate to vigorous physical activity (MVPA) during school hours and significantly improved object control skills (e.g., throwing, catching, and kicking a ball) quantitatively, but this was not significant for total weekly activity. However, students' perceptions of

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				their own athletic abilities decreased. On the other hand, qualitative findings from group interviews showed that students became more cooperative and socially engaged, more motivated, and more comfortable trying new things. They also enjoyed learning PJOK more. Overall, the PEPL method was considered successful in promoting students' physical literacy growth, especially in relation to motor skills and motivation.
Gu et al., (2019)	31	To examine students' current status of physical literacy in third grade.	Cross-sectional	The findings of this study indicate that the physical literacy of third-grade elementary school students is not yet fully developed in all aspects. Most students are in good physical condition and engage in a good level of physical activity; on average, they even exceed the recommended amount of daily physical activity. However, more than half of the students still lack fundamental movement skills and their fitness knowledge is still in the average category, indicating that fundamental movement skills are still relatively low. In addition, it was found that weight and gender affect physical literacy, with students who are of a healthy weight

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				generally having better motor skills and fitness.
Stoddart et al., (2023)	15	To explore the effect of a curricular linked physical literacy enriched intervention in elementary school physical education.	Quasi-experimental	The study findings show that physical literacy-based physical education (PLitPE) interventions significantly improve students' motor skills compared to traditional teaching. Students who participated in the intervention experienced an average increase in motor skills, mastered more motor skills, and participated better in various motor activities. In addition, this intervention helped reduce the ability gap between male and female students. Although there was an increase in physical competence and psychological characteristics, this intervention did not have a significant impact on students' physical activity behavior outside of class. Overall, this program is beneficial in improving physical literacy, especially in terms of children's motor skills and self-confidence.
Romero-Martínez et al., (2025)	3	To analyze the effect of a classroom-based physical activity intervention on children's physical literacy, movement behavior and cognitive perfor mance.	Experimental Study	This study shows how integrating physical activity into the classroom can increase student engagement, improve motor skills, and sharpen thinking skills, especially in mathematics. This shows that when children learn while exercising,

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				their physical health also improves, and their academic performance increases. However, this program has not been successful in increasing children's self-confidence or social support from friends and family. Overall, students' motor skills and learning abilities are greatly improved through active learning.
Huang & Choosakul , (2025)	2	To examine the developmental status of fundamental movement skills, social emotional development, and physical activity in Chinese children aged 7 to 10.	quasi-experimental longitudinal design	The findings of this study show that the Kids' Athletics program effectively increases physical activity levels, social-emotional development, and fundamental movement skills in children aged 7 to 10 years. Children showed improvement in jumping, running, and ball control after participating in this program. Their social-emotional abilities, including self-awareness, cooperation, and emotional regulation, also improved. Children also reduced passive behaviors, such as sitting, and increased their physical activity. In addition, the analysis shows that children's social-emotional development and physical activity levels are positively correlated with their fundamental movement skills.

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Luptáková et al., (2025)	0	To compare these instructional models' impact on students' basic motor competencies (MC) and self-reported physical literacy (PL).	Quasi-experimental	The results of this study indicate that both physical education sessions taught by a single teacher and those using a team-teaching model improved students' physical literacy and fundamental movement skills after participating in the sessions. However, the team-teaching approach was not always proven to be more effective than teaching by a single teacher. On the other hand, children who regularly participate in physical activities outside of school generally have stronger motor skills and physical literacy, and students with better motor skills also have higher physical literacy. In other words, children's motor skills and physical literacy are improved through both physical education and physical activity.
Irmansyah et al., (2025)	0	This study explores the knowledge and understanding of elementary school physical education (PE) teachers regarding the concept of physical literacy (PL) through a phenomenological approach.	Qualitative phenomenologica	According to the study's findings, most physical education teachers in elementary schools still lack a deep understanding of the concept of physical literacy. Teachers often neglect other important elements such as motivation, self-confidence, and students' understanding of physical exercise, and only focus on improving students' physical skills, such as motor skills and fitness. In

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	addition, the implementation of physical literacy in the Merdeka Curriculum has not been optimal due to a lack of training, support, and teacher awareness of the appropriate learning paradigm. As a result, physical education teaching does not yet fully support children's overall development and is not effective in encouraging lifelong participation in physical activity.

DISCUSSION

The importance of physical literacy and fundamental movement skills as the main foundation for successful physical education learning in elementary schools (Liu et al., 2024) prompted this study. However, various studies show that children's fundamental movement skills and physical literacy levels are still inadequate, and the implementation of learning that promotes their development has not been fully effective. Therefore, this systematic review aimed to integrate scientific information regarding the role of instructional methods, the relationship between motor skills and physical literacy, and the importance of teachers' pedagogical competencies in supporting the development of students' movement skills.

Methodology and Teaching Styles in Motor Learning

The results of a systematic review showed that teaching strategies and approaches are very important in encouraging the development of motor skills in elementary school students. Learning strategies that use various techniques and provide opportunities for students to participate actively have been proven to be more effective than conventional strategies (R. M. Hulteen et al., 2018). Based on research by Invernizzi et al., (2019), students' motor skills, fitness, engagement, and enjoyment in physical education increased significantly through the Multi-Teaching Approach (MTA), which combines various teaching philosophies and active reflection. This shows how more meaningful and effective motor learning experiences can be achieved through the application of diverse teaching methods (Casey & Kirk, 2020). Similarly, Telford et al., (2021) found that the Physical Literacy Physical Education Strategy (PEPL) can improve object handling skills, including throwing, catching, and kicking. This strategy focuses on student-centered learning, which encourages students to be more active, motivated, and involved in their learning process (Ennis, 2017). Consistent with these findings, Stoddart et al., (2023), reported that physical literacy-based interventions in physical education significantly improved students' motor

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skills compared to traditional learning approaches. Additionally, Huang & Choosakul, (2025), found that the Kids' Athletics program, which uses active learning methods, can improve fundamental movement skills such as ball control, running, and jumping. Furthermore, this approach also enhances students' social-emotional growth. Based on these results, teaching strategies that provide opportunities for practical application and a variety of motor experiences are essential for developing students' motor skills (Robinson et al., 2015). Overall, the findings of this systematic review suggest that student-centered learning approaches that incorporate diverse instructional strategies and engaging movement experiences represent the most effective methods for improving elementary school students' movement skills.

Correlation Between Physical Literacy with Motor Skills

The results of this review indicated that children's fundamental movement skills and physical literacy have a strong correlation. The development of physical literacy is largely supported by fundamental movement skills. Students with stronger fundamental movement skills generally have higher levels of physical literacy (Gu et al., 2019). On the other hand, students with inadequate fundamental movement skills have suboptimal levels of physical literacy (R. Hulteen et al., 2017). In addition, research by Luptáková et al., (2025), found a direct correlation between improvements in students' physical literacy and improvements in their movement skills. Improved motor skills are associated with increased self-confidence and participation in students' physical activities. This shows that fundamental movement skills form a crucial foundation for the development of physical literacy. Similarly, Romero-Martínez et al., (2025) reported that incorporating physical activity interventions into the learning process can improve students' motor skills and physical literacy simultaneously. Consistent with these findings, Robinson et al. (2015) emphasized that the development of motor competence and physical literacy is closely interconnected. One of the main indicators of improved physical literacy is better object control (Telford et al., 2021). Therefore, the development of physical literacy among elementary school students appears to be highly dependent on their fundamental movement skills. Overall, the findings of this systematic study indicate that the better children's fundamental movement skills are, the higher their level of physical literacy will be. Thus, the main objective of physical education should be the development of fundamental movement skills.

Pedagogy Skills for Motor Learning

Teachers' pedagogical competence plays an important role in supporting the development of students' motor skills. To improve students' motor skills and physical literacy, teachers play an important role in planning, implementing, and assessing effective learning processes. According to Romero-Martínez et al., (2025), incorporating physical activity interventions into the learning process can improve students' movement skills and physical literacy simultaneously. These findings indicate that the development of movement skills and physical literacy are closely related (Edwards et al., 2017). Teachers who use a variety of teaching styles and provide opportunities for student reflection are able to significantly

improve students' motor skills and engagement (Invernizzi et al., 2019). This shows that teachers' pedagogical competence greatly influences the success of motor learning. A physical literacy-based instructional approach can help improve motor skills and reduce ability gaps among learners (Stoddart et al., 2023). This approach emphasizes meaningful learning experiences and student-centered learning. Therefore, teachers' pedagogical competence is a key factor in promoting the development of students' motor skills. Such competence includes the ability to select appropriate instructional strategies, provide constructive feedback, and create a supportive and positive learning environment.

Limitation

There are several limitations to this review. First, the scope of relevant studies may be limited due to the use of a single database (Scopus). Second, language bias may occur because only English-language articles were included. Third, generalization of findings is limited because the number of studies included is relatively small (n = 8). Fourth, direct comparisons and meta-analyses were not possible due to the diversity of study designs and outcome measures. Finally, these results do not fully apply to other levels of education due to the emphasis on physical education in elementary schools. To strengthen the evidence, future evaluations should involve more databases, broader inclusion criteria, and larger samples.

CONCLUSION

Based on the findings of this systematic review, physical literacy and fundamental movement skills are closely related and play a crucial role in physical education in elementary schools. Students with stronger movement skills competence tend to demonstrate higher levels of physical literacy, which in turn encourages greater participation in physical activities. The findings of this study also highlight the effectiveness of physical literacy-based interventions and student-centered teaching strategies in improving students' motor skills, motivation, and participation. In addition, teachers' pedagogical competence plays a critical role in supporting the development of motor learning and physical literacy. Teachers who are able to apply effective instructional strategies, provide meaningful learning experiences, and create a supportive learning environment can significantly enhance students' motor development. As a result, physical education in elementary schools should prioritize the development of fundamental movement skills and physical literacy. The application of appropriate teaching methods and the improvement of teachers' pedagogical competencies are essential to support students' overall development and encourage lifelong participation in physical activities.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest regarding the publication of this article.

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