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Learning motivation, learning environment, and motor ability in physical education outcomes: a systematic review

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ABSTRACT

Physical Education, Sports, and Health (PJOK) learning in elementary schools is influenced by students' learning motivation, learning environment, and motor ability. This study employed a systematic review design following PRISMA 2020 guidelines to synthesize 10 national and international studies published between 2018 and 2025, with inclusion criteria: elementary school participants, PJOK-focused outcomes, and quantitative, qualitative, or mixed-method designs. Findings indicate that intrinsic motivation enhances student participation, persistence, and readiness; supportive learning environments improve engagement, comfort, and opportunities for meaningful practice; and motor ability serves as a fundamental prerequisite for mastering movement skills. The integration of these factors highlights the need for a comprehensive approach addressing psychological, environmental, and motor-development aspects. These findings provide an evidence-based foundation for developing more effective, developmentally appropriate PJOK instructional strategies.

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Introduction

Physical Education, Sports, and Health (PJOK) plays a critical role in developing students' physical, cognitive, and affective capacities, aligning with national education goals. At the elementary school level, PJOK should not only promote physical activity but also foster learning motivation, provide supportive learning environments, and enhance motor ability as a foundation for long-term movement development. Well-designed PJOK programs can contribute to holistic child development, preparing students for healthy lifestyles and academic success.

International research highlights learning motivation as a key determinant of participation and achievement in physical activity–based subjects. Studies show that intrinsic motivation consistently predicts engagement, persistence, and performance in physical education (García-Ceberino et al., 2022; Simón-Chico et al., 2023). Motivation can be strengthened through autonomy support, meaningful task design, and constructive feedback, all of which influence students' effort and practice behaviors.

The learning environment, both physical and psychosocial, also significantly affects PJOK outcomes. Positive environments enhance engagement, confidence, and skill acquisition (J. Guo et al., 2022; Sökmen, 2019). National studies confirm that adequate facilities, classroom management, and social support directly contribute to better learning outcomes in PJOK (Anwar et al., 2024; Zulpahmiri et al., 2024). A well-structured environment reduces psychological barriers such as anxiety or fear of failure, enabling more effective participation in motor tasks.

Motor ability is a foundational component that underpins physical performance and readiness in PJOK. Children with higher fundamental motor skills and motor competence demonstrate faster skill acquisition and improved performance (Putra et al., 2024; Shah, 2020). Delays in motor development can limit students' engagement and increase cognitive load during practice, making it essential for PJOK curricula to include structured motor skill development from early grades.

Despite the recognized importance of motivation, environment, and motor ability, current conditions in many elementary schools show suboptimal PJOK outcomes. Low learning motivation, limited facilities, weak classroom management, and delayed motor development have been reported nationally (Fahrizqi et al., 2021; Hasmirati et al., 2023; Chan-anteza, 2020; Obetta & Shaibu, 2025; Berleze & Valentini, 2022; Jones et al., 2021). Globally, sedentary lifestyles further reduce physical activity, negatively impacting motor competence and academic performance (Hernández, 2025; Santos et al., 2021). These findings highlight a persistent gap between ideal PJOK goals and observed realities.

Previous research has generally examined motivation, environment, and motor ability separately, with limited exploration of their interrelationships. Some studies focus solely on motivation without considering environmental or motor factors (Gokeler et al., 2019), while others analyze the learning environment but overlook motor readiness (Cadoret et al., 2018). Systematic reviews integrating all three determinants remain scarce at national and international levels. A comprehensive review is therefore needed to provide a clearer understanding of how these factors jointly influence PJOK learning outcomes.

This study addresses this gap by synthesizing recent empirical evidence from national and international research. It examines the interactions among learning motivation, learning environment, and motor ability in shaping PJOK outcomes. By doing so, this review provides theoretical and practical insights to inform the design of developmentally appropriate, multi-component instructional strategies. Findings are expected to support teachers, schools, and policymakers in enhancing elementary-level PJOK learning, while guiding future empirical investigations.

Method

This study employed a systematic review design to analyze the relationships among learning motivation, learning environment, and motor ability in determining PJOK learning outcomes in elementary school students. A systematic review was chosen because it allows for a structured synthesis of empirical evidence while maintaining transparency and replicability. The review followed the PRISMA 2020 guidelines, which include four stages: identification, screening, eligibility assessment, and inclusion. Articles were retrieved from five major databases: Google Scholar, ScienceDirect, ERIC, DOAJ, and SINTA. Searches covered publications from 2018 to 2025 using both English and Indonesian keyword combinations, including "learning motivation," "learning environment," "motor ability," "fundamental motor skills," "physical education learning outcomes," "motivasi belajar," "lingkungan belajar," "kemampuan motorik," and "hasil belajar PJOK."

Inclusion criteria required studies to be published in accredited national journals or reputable international journals, involve elementary school students, focus on PJOK learning outcomes, and employ quantitative, qualitative, or mixed-method designs with full-text availability. Exclusion criteria were proceedings, theses, dissertations, studies outside the field of physical education, participants other than elementary school students, or studies that failed methodological quality checks. After removing duplicates, 860 articles remained, which were screened based on titles and abstracts. Forty-two full-text articles were assessed for eligibility, and ten studies met all criteria and were included in the final synthesis.

Methodological quality was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist, adapted to each study type (cross-sectional, experimental, or qualitative). Criteria included clarity of design, sample adequacy, validity of instruments, analytical rigor, and consistency of results, with studies scoring below 70% excluded. All steps of study selection, including identification, screening, eligibility, and inclusion, were documented using a PRISMA flow diagram. This process ensured traceability, minimized selection bias, and allowed for a transparent and replicable review of the evidence on PJOK learning determinants.

Data were analyzed using a narrative synthesis approach. The analysis involved: (1) grouping studies based on learning motivation, learning environment, and motor ability; (2) comparing findings across studies; (3) identifying patterns of relationships among variables; and (4) synthesizing theoretical and practical implications for PJOK instruction.

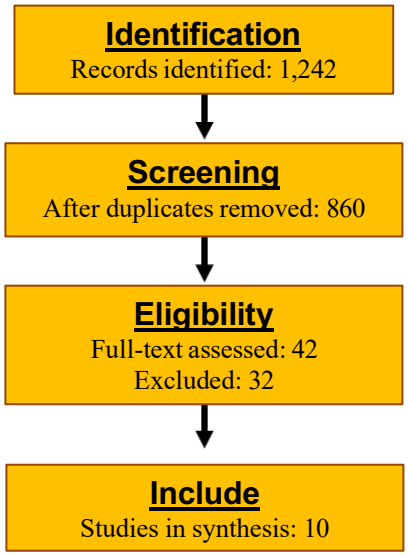

Figure 1. PRISMA 2020 Diagram Flow

Results and Discussions

The selection process followed the PRISMA 2020 flow and resulted in 10 eligible articles for the final synthesis. The included studies consisted of six international and four national peer-reviewed, open-access articles examining learning motivation, learning environment, and motor ability in relation to Physical Education, Sports, and Health (PJOK) learning outcomes among elementary school students. Table 1 presents the characteristics of the included studies. The results are organized into three main analytical themes: 1) Learning motivation and PJOK outcomes; 2) Learning environment and PJOK outcomes; 3) Motor ability and its relationship with PJOK outcomes.

Table 1. Summary of the Characteristics of the Included Studies (n = 10)

Article Code	Authors (Year)	Country	Sample	Variable Focus	Research Design
A1	Fernández-Espínola et al. (2020)	Spain	428 students	Motivation → PE performance	Quantitative
A2	Huéscar et al. (2020)	Spain	211 students	Autonomy support → Motivation	Experimental
A3	Chen et al. (2023)	China	314 students	FMS → Fitness & Performance	Quantitative
A4	Liu et al. (2024)	China	234 students	Motor ability → PA level	Cross-sectional
A5	Koolwijk et al. (2024)	Netherlands	175 students	Motor competence	Longitudinal

Article Code	Authors (Year)	Country	Sample	Variable Focus	Research Design
A6	Moon et al. (2024)	Korea	18 studies	Environment → Physical activity	Systematic review
A7	Sipayung et al. (2025)	Indonesia	92 students	Motivation → PJOK outcomes	Quantitative
A8	Anggraeini & Wiguno (2024)	Indonesia	120 students	Gross motor skills → PJOK readiness	TGMD survey, Descriptive
A9	Saleh et al. (2024)	Indonesia	63 students	Gross motor ability	Quasi-experimental
A10	Alfanthoriq et al. (2024)	Indonesia	48 students	Environment → PJOK performance	Experimental

Learning Motivation and PJOK Learning Outcomes

Four studies (40%) examined the relationship between learning motivation and PJOK outcomes. Across these studies, intrinsic motivation consistently showed positive associations with students' participation, persistence, engagement, and physical performance. Motivation functioned as a psychological driver that strengthened effort and practice behavior in physical education contexts. Table 2 summarizes the findings:

Table 2. Summarizes the findings from studies analyzing motivation

Article Code	Key Findings	Implications
A1	Intrinsic motivation predicts PE performance	Autonomy-supportive environment
A2	Autonomy support increases motivation & activity	Higher motivation → higher practice improves outcomes
A7	Higher motivation → higher PJOK scores	Teacher support strengthens motivational pathways; motivation is essential for achievement

Learning Environment and PJOK Learning Outcomes

Three studies (30%) evaluated the influence of the learning environment both physical and psychosocial on PJOK outcomes. All studies demonstrated that high-quality learning environments improved student engagement, readiness, and performance. Better facilities, supportive classroom climates, and adequate equipment consistently correlated with higher PJOK achievement. Table 3 presents the synthesized findings:

Table 3. Findings on Learning Environment and PJOK Outcomes

Article Code	Environmental Component	Key Findings	Implications
A6, A10	Physical & psychosocial	Facilities & task support	Supportive environments increase child activity; better facilities → improved PJOK performance Schools must optimize PE spaces; infrastructure must pair with pedagogy

Motor Ability and PJOK Learning Outcomes

Five studies (50%) examined motor ability and its relationship to PJOK outcomes. All studies found strong positive correlations between fundamental motor skills (FMS), motor competence, or gross motor ability and students' performance in physical education. Higher motor ability reduced cognitive load, enhanced skill acquisition, and improved practical evaluations. Table 4 summarizes the main findings:

Table 4. Findings on Motor Ability and PJOK Outcomes

Article Code	Type of Motor Skill	Key Findings	Implications
A3	Fundamental Motor Skills	FMS predicts fitness & PE performance	FMS training essential; strengthen motor capacity early
A4	Motor ability	Motor ability predicts school PA levels	Long-term motor development needed
A5	Motor competence	Higher competence predicts movement performance	Early screening recommended; structured intervention required
A8	Gross motor skills	Low FMS → difficulty following PJOK	-
A9	Gross motor ability	Most students at medium–low category	-

This systematic review synthesizes evidence from ten national and international studies to examine the roles of learning motivation, learning environment, and motor ability in influencing PJOK learning outcomes among elementary school students. The findings confirm that these factors are not independent but interact dynamically to shape students' engagement, skill acquisition, and performance. By integrating national and international perspectives, this study highlights both consistent patterns and contextual differences, providing a comprehensive understanding of determinants that underpin effective PJOK instruction.

Learning motivation emerged as a central determinant of PJOK outcomes, with intrinsic motivation repeatedly linked to higher participation, persistence, and performance (Fernández-Espínola et al., 2020; Jusran & Taufik, 2025; Q. Guo et al., 2025; Zhou et al., 2024). Autonomy support, clear task value, and constructive feedback strengthen intrinsic motivation and drive students' effort and practice behavior. However, differences in study designs and sample sizes suggest that the strength of this relationship may vary across contexts, emphasizing the need for careful interpretation of findings and consideration of local classroom conditions.

The learning environment, encompassing both physical and psychosocial dimensions, significantly affects student outcomes in PJOK. Adequate facilities, supportive classroom climates, and positive teacher–student interactions enhance engagement and reduce psychological barriers such as fear of failure (Galdames-Calderon et al., 2024; Killoughery et al., 2025; Acero & Guillena, 2024; Saputra et al., 2025). Nonetheless, the reviewed studies did not systematically differentiate between physical and psychosocial influences or consider variations across schools, highlighting a gap in understanding which environmental components most strongly moderate the impact of motivation and motor ability.

Motor ability consistently emerged as a prerequisite for effective PJOK learning, with fundamental motor skills, coordination, balance, and agility strongly predicting skill acquisition and performance (Makaruk et al., 2023; Shi & Feng, 2022; Oktarifaldi et al., 2024; Taufik et al., 2024). Children with higher motor competence experience lower cognitive load during practice, allowing greater focus on complex skills. However, most studies focused on FMS or gross motor skills, with limited attention to other aspects such as muscular strength or endurance, which may also influence PJOK outcomes.

Importantly, the interaction among motivation, environment, and motor ability underscores the need for integrated interventions. High motivation alone may be insufficient without motor readiness or supportive environments, while strong motor skills and quality environments can amplify the effects of motivational strategies. Several studies suggested potential moderating and mediating effects, though few applied statistical models to test these interactions explicitly, leaving gaps for future research using methods such as structural equation modeling.

Despite consistent patterns, heterogeneity among studies, including differences in methodology, sample size, and cultural context, limits the generalizability of findings. National studies often reported lower motivation or limited facilities compared to international contexts (Fahrizqi et al., 2021; Hasmirati et al., 2023; Chan-anteza, 2020; Obetta & Shaibu, 2025), suggesting that contextual factors must be considered when applying these findings to curriculum design. Risk of bias, small sample sizes, and lack of longitudinal evidence were additional limitations across reviewed studies.

The practical implications are multifaceted. PJOK programs should integrate structured motivational strategies, such as goal-setting, self-reflection, and recognition of progress, with infrastructure improvements and teacher training to align physical and psychosocial support. Systematic development of fundamental motor skills from early grades is essential to prepare students for complex physical tasks. Multi-component interventions targeting motivation, environment, and motor ability simultaneously are likely to yield the most effective outcomes.

In conclusion, this review demonstrates that PJOK learning outcomes depend on a dynamic interplay of motivation, environment, and motor ability. Future research should adopt longitudinal designs, test interaction effects quantitatively, and examine contextual variables such as socioeconomic status or cultural differences. These efforts will strengthen evidence-based strategies for enhancing elementary-level PJOK instruction and provide actionable insights for teachers, schools, and policymakers seeking to optimize student engagement and performance.

Conclusions

The findings of this systematic review demonstrate that learning motivation, learning environment, and motor ability collectively serve as the principal determinants of PJOK learning outcomes in elementary school students. Intrinsic motivation consistently promotes greater participation, persistence, and task performance, while supportive physical and psychosocial learning environments strengthen student engagement and facilitate effective instruction. Motor ability functions as a fundamental prerequisite for the acquisition and execution of essential movement skills, thereby contributing directly to students' practical achievement in PJOK. The review further indicates that these three factors operate interactively rather than independently, forming a unified framework that influences the effectiveness of PJOK learning. Accordingly, improving PJOK learning outcomes requires a holistic and coordinated approach that enhances student motivation, optimizes learning conditions, and systematically develops motor competencies. These conclusions provide a clear evidence base for the development of integrative, data-driven, and developmentally appropriate instructional strategies in elementary school physical education.

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