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Physical Literacy Development of Elementary Students in Physical Education Classes

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Abstract
The reduction of physical activity among children continues to be a major concern globally, including in Indonesia. The purpose of this study is to analyze physical literacy in upper-grade elementary students (V and VI) from SD Negeri Cepoko and SD Negeri Sadeng 01, Semarang City, employing a descriptive quantitative survey method. The study employed a total sampling method, involving 89 participants. Physical literacy was assessed across three domains: physical competence (measured through TIAMSA, PACER, and Sit-Up tests), motivation and self-confidence, as well as knowledge and understanding. The results revealed that most students were classified as progressing, with only a quarter reaching the achieving category. At SD Negeri Cepoko, all students were categorized as progressing, whereas in SD Negeri Sadeng 01, a number of students particularly male students in grade V and female students in grade VI reached the achieving level. These results highlight disparities in physical literacy outcomes between schools and student groups. Hence, improvements in PJOK learning strategies, teacher development, and supportive learning environments are required to encourage sustainable participation in physical activity.

Keywords: physical literacy; primary school; physical education; physical competence

1. Introduction

Insufficient physical activity has emerged as a worldwide public health concern. Reports show that around one-third of adults and the majority of adolescents are still below the recommended activity levels. This inactivity contributes to a higher risk of premature mortality and various health problems such as obesity and overweight (Willumsen & Bull, 2020). A similar condition is observed in Indonesia, where children's engagement in physical activity remains limited and does not yet meet the guidelines proposed by the World Health Organization (WHO) (Rosiana et al., 2023). Physical literacy is increasingly recognized as an important element in 21st century physical education. In this context, (Effendi et al., 2022) emphasized that physical literacy-based PJOK learning is a strategic solution to increase student active participation from an early age. Shifts in lifestyle patterns have increased children's engagement in sedentary activities, including gadget use and prolonged screen time (Yoga Brata Susena, Danang Ari Santosoaa, and Puji Setyaningsih 2021). This situation is exacerbated by the dominant school learning orientation in the classroom, even though early childhood tends to prefer exploratory activities outdoors (Ratnasari, 2020). On the other hand, the development of science and technology (IPTEK) has not fully had a positive impact on physical education, because this subject is still seen as complementary and receives less attention than other academic subjects (Tarju, 2017). Recent studies also show that technological

developments and lifestyle changes demand a more adaptive approach to physical literacy (Adi et al., 2024; Adi, Rohidi, et al., 2023).
Education has a vital role in Indonesia's national development strategy, reflected in Law No. 20 of 2003 on the National Education System and the annual allocation of 20% of the state budget for education (Kementerian Pendidikan dan Kebudayaan, 2021) Efforts to expand access and improve educational quality continue to ensure equal rights for all citizens. Within the primary education system, physical education is a crucial component that contributes not only to physical growth but also to the cognitive, affective, and social development of children. Through PE, students develop healthy habits, enhance motor skills, and cultivate values such as teamwork, sportsmanship, and responsibility (Bailey,R. , Armour,K. ,Krik,D., Jess,M., Pickuo,I., and Sandford, 2009). As a result, the physical condition of Indonesian children is disturbed and the goals of national education as stated in Article 3 of the National Education System Law Number 20 of 2003 become difficult to achieve.

Nevertheless, the current physical condition of Indonesian children suggests challenges in achieving the goals of national education as outlined in Article 3 of the National Education System Law. PE (PJOK) is a compulsory subject overing all educational levels, ranging from primary to secondary education (Adi et al., 2024; Adi S et al., 2018) and play an important role in shaping character and maintaining the physical fitness of students (Rozi et al., 2023). According to (Yusuf Effendi et al., 2022) physical literacy comprises motor skills, motivation, self-confidence, and knowledge and understanding, which together form the foundation for lifelong active habits. Moreover, PE also contributes to enhancing students' concentration, memory, and academic performance (Aliriad et al., 2024; Da'i et al., 2024; Mustafa, 2022) In fact, PJOK plays a role in improving students' concentration, memory, and academic learning outcomes (Apriyanto & Adi, n.d.; Candra et al., 2023). Thus, physical education should not be viewed merely as physical activity but as an educational process aimed at holistic human development (Iyakrus, 2019; Kholis et al., 2024).

In practice, elementary school PE often focuses primarily on sports techniques rather than adopting a holistic literacy-based approach. In fact, a holistic approach through physical literacy is increasingly essential. Motivation, confidence, physical skills, and understanding are integral components of physical literacy, all of which encourage individuals to maintain an active lifestyle throughout life (Whitehead, 2010a). Therefore, physical literacy should be nurtured from an early age through meaningful physical education.

Unfortunately, PJOK practices in Indonesia have not fully adopted this approach. The learning process is still traditional and does not support the development of the overall physical literacy dimension (Wibowo & Susongko, 2023). In fact, elementary school is a critical stage in the development of fundamental motor skills (Barnett, L. M.; Stodden, D. F.; Cohen, K. E.; Smith, J. J.; Lubans, D. R.; Lenoir, M.; Morgan, 2021). which is the basis for building an active and healthy lifestyle in the long term (Cairney et al., 2019). For this reason, physical literacy needs to be integrated into the curriculum and supported by an exploratory and fun learning environment (Youth Sport Trust, 2013).

The implementation of physical literacy also requires standardized assessments, adequate teacher training, and support for education policies oriented towards a holistic approach (Li et al., 2020). Without a clear implementation strategy, the potential for physical literacy to shape students'

character and competencies will be difficult to realize optimally (Husnan et al., 2023). Therefore, strengthening physical literacy at the elementary school level is an urgent need (Gustian, A.; Andromeda, A.; Son, 2020).
On the other hand, the term physical literacy in Indonesia is still not widely known. The term is often interpreted in several ways, with physical literacy being the most widely used (Widodo, 2018) However, there is no established terminology agreement. Research and publications related to physical literacy in Indonesia are also still very limited (Permana & Habibie, 2020). This is in contrast to neighboring countries such as Malaysia, which have begun to introduce the concept of physical literacy from the time children enter primary school (Reni et al., 2024).

In fact, physical literacy has many benefits such as increased immunity, the ability to move confidently, and responsiveness using cognitive ability and imaginative thinking (Arindi et al., 2023). If optimally developed, physical literacy can help learners explore their best potential and improve their quality of life (Bachtiar et al., 2024). Adi S.'s other research also shows that teachers have a key role in facilitating meaningful experiences to support students' physical literacy achievements (Adi et al., 2025) For this reason, the involvement of PJOK schools and teachers is very important in providing a quality understanding and experience of physical activity (Reni et al., 2024; Rosiana et al., 2023).

Based on this rationale, the present study aims to examine the role of physical literacy in elementary school PE and to identify effective instructional strategies for improving students' physical literacy. It further explores the relationship between motivation, movement competence, and students' perceptions of the physical learning environment. The findings are expected to contribute to curriculum development, teacher training, and the promotion of an active lifestyle from an early age.

2. Method

Research design
This study used a quantitative descriptive survey design to assess students' physical literacy (Creswell, 2014; Septian & Adi, 2025; Sugiyono, 2019). The approach is considered suitable for describing social phenomena statistically and generalizing results (Ary et al., 2010; Nu'man, 2023).

Participants
The population consisted of all grade V and VI students at SD Negeri Cepoko and SD Negeri Sadeng 01, Semarang City. A total sampling technique was applied, resulting in 89 students as participants.

Table 1. Research sample

NO	School	Class	Female Students	Male Students	TOTAL
1.	SD N CEPOKO	5 & 6	20	20	40
2.	SD N SADENG 01	5 & 6	28	21	49

Technical data collection
Instruments and Data Sources. Physical literacy was measured across three domains:
1) Physical competence (TIAMSA, PACER, Sit-Up) (Fathiyati et al., 2022)
2) Motivation and self-confidence, and

3) Knowledge and understanding (Permana & Habibie, 2020; Yusuf Effendi et al., 2022)
The instruments referred to validated developments by Adi S. on elementary students' physical competence (Septian & Adi, 2025).

Assessment
The scoring system is categorized on a scale of 1 to 4, with classifications ranging from very inappropriate, inappropriate, appropriate, to very appropriate. Students' responses are calculated by summing the score of each answer with the total number of questions in the respective domain. Once the total scores for each student are obtained, the researcher interprets the results using a specific formula:

Formula for calculating questionnaire score results
The final score is interpreted as follows
Results of the number of students (1-40) X 100 : Highest score (40) = Score results (1-100)

Table 2. Questionnaire classification

Beginning	Progressing	Achieving	Excelling
0-25	26-50	51-75	76-100

Table of norms
The assessment of students' physical literacy was based on four normative categories: Beginning, Progressing, Achieving, and Excelling. These categories served as benchmarks for determining students' levels of physical literacy. The final score was calculated by considering the overall value across all physical competency domains.

Physical competency assessment (0-30 points) = TIAMSA (10 points) + PACER (10 points) + SIT UP (10 points)

Method of calculating physical literacy assessment results
After calculating the total points from all test items, the final score can then be compared with the classification provided below:
Data analysis techniques
Results were processed descriptively using Microsoft Excel and categorized into four levels : beginning, progressing, achieving, and excelling (Longmuir & Tremblay, 2016).

Table 3. Interpretation of physics literacy assessment categorization

Age (year)	Beginning	Progressing	Achieving	Excelling
		Female		
8 Years	<13.2	13.2-18.0	18.1-20.3	>20.3
9 Years	<13.7	13.7-18.6	18.7-20.9	>20.9
10 Years	<14.1	14.1-19.1	19.2-21.6	>21.6
11 Years	<14.5	14.5-19.8	19.9-22.3	>22.3
12 Years	<15.2	15.2-20.7	20.7-23.3	>23.3
		Male		
8 Years	<13.4	13.4-19.4	19.5-22.0	>22.0
9 Years	<13.7	13.7-19.9	20.0-22.5	>22.5
10 Years	<14.0	14.0-20.3	20.3-23.0	>23.0
11 Years	<14.3	14.3-20.8	20.9-23.6	>23.6

12 Years	<14.9	14.9-21.6	21.7-24.5	>24.5

3. Results

Physical literacy assessment results (TIAMSA, PACER, SIT UP) grade 5

Table 4. Outcomes of physical literacy assessment among fifth-grade male and female students of SD Negeri Cepoko and SD Negeri Sadeng 01

SD Negeri Cepoko				
Gender	**Class**	**Average score**	**Point Average**	**Classification**
Male	5	14,80	15	Progressing
Woman	5	14,30	14	Progressing
SD Negeri Sadeng 01				
Gender	**Class**	**Average score**	**Point Average**	**Classification**
Male	5	19,42	20	Achieving
Woman	5	15,80	16	Progressing

This study evaluated grade V students' physical literacy using the TIAMSA, PACER, and Sit-Up instruments. The research used a total sampling technique, namely all grade V students from two public primary schools located in Semarang City, specifically SD Negeri Cepoko and SD Negeri Sadeng 01.

Physical literacy assessment results (TIAMSA, PACER, SIT UP) Grade 6

Tabel 5. Evaluation of physical literacy achievement for six-grade male and female students at SD Negeri Cepoko and SD Negeri Sadeng 01

SD Negeri Cepoko				
Gender	**Class**	**Average score**	**Point Average**	**Classification**
Male	6	15,56	15	Progressing
Female	6	14,80	15	Progressing
SD Negeri Sadeng 01				
Gender	**Class**	**Average score**	**Point Average**	**Classification**
Male	6	18,69	19	Progressing
Female	6	16,30	16	Stiffness

The assessment of physical literacy for grades V and VI was conducted at two elementary schools in Semarang using the TIAMSA, PACER, and Sit-Up tests. A total sampling approach was applied, ensuring all students participated. In general, the achievement of physical literacy at SD Negeri Cepoko is still classified as a progressing category in all groups. The average score ranges from 14.30 to 15.56, with classification points of 14-15. This shows that students' physical literacy skills are still in the development stage. Meanwhile, at SD Negeri Sadeng 01, the results were more varied. Two groups of student grade V boys and class VI girls were in the achieving category with an average score of 19.42 and 16.30. Meanwhile, the other group is still progressing, even though with higher achievements than the previous school.

From eight observed groups, only a quarter attained the achieving level, while the majority remained in the progressing stage. The outcomes align with previous studies (Adi et al., 2025) indicating that most elementary students in Central Java are still developing in terms of physical literacy. Which revealed that the majority of elementary school students in Central Java are still in the developmental phase in physical literacy (Fathiyati et al., 2022; Septian & Adi, 2025).
The gap between schools and between groups shows the need to strengthen the implementation of PJOK based on fun physical activity, support for an active learning environment, and parental involvement to encourage a culture of active living among elementary school students.

Table 6. Results of motivation and confidence, knowledge and understanding

SD Negeri Cepoko		
Average max class 5	Value	Average max grade 6
Female	77,5	82,5
Male	75	87,5
Minimum average		Average minimum grade 6
Female	55	57,5
Male	52,5	57,5
SD Negeri Sadeng 01		
Average max class 5		Average max grade 6
Female	80	82,5
Male	77,5	87,5
Minimum average		Average minimum grade 6
Female	60	47,5
Male	55	52,5

4. Discussion

Questionnaire outcomes revealed a generally high interest in physical activity. Pupils from both schools enjoyed sports, were willing to attempt new movements, and demonstrated strong confidence in joining physical tasks. These findings are in line with opinion (Whitehead, 2010b) and (Cairney et al., 2019) which emphasizes that motivation and confidence are the main components of physical literacy. In this context, the support of students' intrinsic motivation is very obvious, as explained by (Deci & Ryan, 2000) that a person tends to be active when he has an impulse from within himself. (Adi, Soegiyanto, et al., 2023) It also emphasizes that encouragement from within children is an important foundation in forming an active and confident character in physical activities.

Enjoyable experiences in physical activities serve as key motivators for student engagement. Research (Giblin et al., 2014) and (Shearer et al., 2018) Shows that enjoyable experiences in sports activities play an important role in strengthening long-term engagement. Students not only enjoy physical activity, but also have an interest in continuing to learn and develop their movement skills. This reflects the importance of experiential learning that is pleasing, as suggested in a comprehensive pedagogic approach by (Adi, Soegiyanto, et al., 2023) so that physical literacy becomes part of children's life experiences, not just classroom activities.

Learners at both schools displayed constructive attitudes toward sports challenges, perceiving activities as engaging rather than monotonous, and maintaining enthusiasm even when confronted

with difficulties. This attitude indicates a strong intrinsic motivation (Deci & Ryan, 2000) which is a key factor in maintaining long-term active participation (Francis et al., 2016). Instilling active habits from an early age is also important in this context (Robinson et al., 2015). The support of the school environment and teachers is an important element in forming these habits, as stated (Adi et al., 2024) in the study regarding the crucial role of an adaptive environment in fostering children's physical literacy.

With regard to of skills and physical activity, students' perceptions do vary, but in general they show positive tendencies. Competence in movement forms the foundation for sustained participation across diverse physical activities (Longmuir & Tremblay, 2016) PJOK teachers play a crucial role in creating fun and meaningful learning (Ennis, 2015) This is supported by the findings (Effendi et al., 2022) that the effectiveness of PJOK learning is highly dependent on the quality of teacher-student interaction in creating an inclusive and constructive atmosphere. On the knowledge side, most students understand the benefits of exercise and the importance of maintaining physical fitness (Corbin, 2016)Although there are deficiencies in the understanding of physical activity guidelines and the definition of cardiorespiratory fitness (Longmuir & Tremblay, 2016; Tremblay et al., 2018).

Overall, the outcomes of the research suggest that the physical literacy of students across the two elementary schools is relatively good, especially in the dimensions of attitude, knowledge, and motivation. These findings reinforce the literature that physical literacy is an important foundation in shaping a healthy and active lifestyle in school-age children (Shearer et al., 2018; Whitehead, 2010a). Therefore, the implementation of physical literacy as a whole in the physical education curriculum is an urgency that cannot be ignored. This is in line with the view (Yusuf Effendi et al., 2022) that physical literacy is not only the result of the learning process, but also a comprehensive children's character education strategy, which includes physical, cognitive, and affective aspects (Saputra et al., 2025).

5. Conclusion and Recommendation

Overall, students in grades V and VI were mostly in the progressing stage of physical literacy, with only a few groups reaching the achieving category. This shows that physical literacy skills are still in the developmental stage and are not evenly distributed throughout the group. Differences in achievement were also seen between gender groups, reflecting the importance of tailored approaches in physical education learning.

The findings of the questionnaire revealed that the majority of students have a high interest and motivation for physical activity, along with confidence and a basic understanding of the benefits of exercise. However, there are still weaknesses in the aspect of knowledge, especially related to physical activity guidelines and cardiorespiratory fitness. This indicates the need to strengthen PJOK teaching materials and methods more comprehensively.

The development of physical literacy in primary schools requires an integrated approach that includes an adaptive curriculum, teacher training, and a supportive learning environment. Literature study by Adi S. emphasizes that physical literacy must be developed as part of a child's character through a holistic and contextual approach (Septian & Adi, 2025).

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