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Domain-specific physical literacy profiles of elementary physical education teachers in rhythmic activity instruction

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Article Info

Article history:

Received Jun 24th, 2026
Revised Jul 16th, 2026
Accepted Jul 20th, 2026

Keywords:

Physical literacy
Rhythmic activity
Teacher competence
Motor competence
Elementary physical education

ABSTRACT

Teachers' own physical literacy, a necessary condition for effective instruction, remains relatively unexplored, especially in the context of rhythmic activity within non-Western elementary school settings. This paper investigates the level of physical literacy of teachers involved in rhythm-based physical education activities across five domains: cognitive understanding, motor competence, balance ability, object control, and environmental participation. A cross-sectional survey was conducted involving 52 elementary PE teachers (37 males, 15 females) from Yogyakarta, Indonesia. Physical literacy was assessed using a 20-item questionnaire designed to measure all five domains, with descriptive data presented as a percentage of total attainment compared with previously determined category thresholds. Teachers were found to be most competent in object control (55%) and cognitive understanding (53%), with moderate levels in environmental participation (51%), whereas motor competence (42%) and balance ability (39%) were comparatively low, with balance the weakest of the five domains. The integrated level of physical literacy of the teachers was 49% (average category). This gap between teachers' cognitive understanding and their physical and balance skills is likely to affect learning strategies in rhythmic activities, where balance and movement coordination are central topics. These findings support physical education courses focusing on motor and balance skills, rather than relying only on general awareness and promotion of physical literacy, in the professional development context of rhythmic activity teaching.



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Introduction

Poor physical activity levels among children and adolescents are one of the most difficult public health issues facing today's world. Recent global data pooled together suggests that most of the world's 青少年 are not active enough to fulfill the physical activity recommendations, and the rate of physical inactivity throughout the world is increasing instead of decreasing, which makes most countries miss the international targets of physical activities for 2030 (World Health Organization, 2024). This issue is especially alarming when it comes to children because during childhood, movement competency, confidence, and activity habits are being formed. Schools in general, and physical education in particular, are the most trustworthy venues that consistently get identified as settings in which children's engagement with movement can be influenced (Wilkie et al., 2024).

In the face of global physical inactivity, physical literacy has been a major, whole-body approach to understanding and encouraging lifelong physical activity, first proposed 20 years ago. From the monism, existentialism, and phenomenology streams of philosophy, the authors came up with the physical literacy which, in its essence, is an attitude, confidence, physical ability, knowledge, and understanding that are needed to put physical activity as an important component of your life and to take charge of it throughout your life (Whitehead, 2001, 2010, 2019). This definition was later on approved and spread out worldwide by the International Physical Literacy Association (2017). Since then, it has become part of the national physical activity and education policy of several countries and is regarded more and more as a sign of quality physical education at policy level (Wilkie et al., 2024).

This growing awareness within the larger discourse highlights the importance of viewing the teacher as a significant role model for the students beyond only being a source of information for the child. It is suggested that a teacher's own physical literacy largely shapes the physical literacy outcomes of the students whom he/she teaches. Yin et al. (2024) through a recent comprehensive study of physical education teachers' physical literacy and assessments, found strong evidence that children's participation in physical activity and their development of physical literacy is quite strongly dependent on the level of the teachers physical literacy. At the same time, it was also found that research on physical literacy of the teachers is empirically very little and very methodologically inconsistent compared to the body of literature that focuses on student outcomes. Besides this, Wilkie et al. (2024)'s qualitative research, in line with our study, shows that even though the teachers are exposed to physical-literacy-based curricula professionally, a clear conceptual understanding of the construct can still be lacking on a personal level with the teachers which in turn can result in the teachers being unable to make a transition from a theory to practice.

Taking into account the literature, a close review shows that there is a structural gap. It seems that the majority of empirical research on teacher physical literacy has taken place in high-income, English-speaking countries with well developed assessment systems like the Canadian Assessment of Physical Literacy and the PLAY tools (Cairney et al., 2018; Dutil et al., 2018; Wright et al., 2020). Outside of these systems, most teacher physical literacy research has been descriptive rather than experimental, focusing more broadly on teachers' comprehension of the concept. Very rarely does one see quantifiable results of teacher physical literacy attainment, that is, teachers' competence across the various domains that constitute teacher physical literacy. In such a situation, identifying which physical literacy-related areas are strengths and which areas teachers need to develop further remains as one of the most fundamental questions that one has in diagnosing teacher physical literacy. This information is also what is needed as a base in making decisions on targeted, not generic, professional development.

Physical literacy research literature as a whole, however, remains both definitionally and methodologically heterogeneous. Such a situation makes it rather challenging to carry out any cross-study comparison of teacher physical literacy research results. Bailey et al. (2023), Edwards et al. (2017), and Grauduszus et al. (2023) in their systematic analyses of the physical literacy definition and how it has been operationalized across the globe have pointed out that the inconsistencies remain both conceptually, as well as in the physical and psychosocial perspectives, despite the fact that measurement tools have multiplied. The authors also observed that most of the current assessment tools, including teacher-specific ones like the Perceived Physical Literacy Instrument, were mostly developed and validated mainly in Western culture with very few of the adaptations having being tested against Southeast Asian or Indonesian samples (Jean De Dieu & Zhou, 2021; Sum et al., 2016). The authors of the current paper suggest the importance of collecting context-specific disaggregated by domain data such as these ones. Work on teacher education has also pointed out that the knowledge of physical literacy held by pre-service and in-service physical education teachers is still very uneven in cases where physical education of teacher training exists, whereas pedagogical approaches that translate physical literacy into classroom practice are still being refined (Hernández-Sánchez et al., 2025; Valle-Muñoz et al., 2025) This kind of difference in the concepts of physical literacy makes it very important to collect detailed context-specific and by domain data like those aimed at in the present study.

Indonesia is a good example of this situation. Physical literacy has relatively recently been introduced to the physical education discussion in Indonesia, and studies in this field have either used physically literate students as subjects with the modified version of internationally developed physical literacy assessment instruments (Suntoda & Wibowo, 2021) or teachers' understanding of physical literacy was assessed phenomenologically via semi-structured interview methods (Irmansyah et al., 2021, 2024; Friskawati, 2024). Throughout these works, one finds commonly repeated theme is the insufficient level of physical literacy knowledge and understanding among teachers and students, which also reflects on their physical competence, though it stands out that their motivation is much stronger (Irmansyah et al., 2024; Suntoda &

Wibowo, 2021). Still not much of such a research is focused on doing a quantitative assessment that is also disjoined by domain level for teachers' physical literacy that is directly connected with a specified content area of a curriculum (one of the curriculum-mandated courses or content areas). This would allow the results to be readily implemented into in-service training for specific content rather than just general awareness campaigns.

Gymnastics is a general class of gymnastics that under Fédération Internationale de Gymnastique is divided into artistic, rhythmic sport, acrobatic, and trampoline gymnastics. Rhythmic activity is the term used here. Elementary school physical education is one place among many that have decided to keep it in the curriculum for reasons connected to the physical and psychological development of the pupil, such as improving balance, developing coordination and flexibility, and strengthening cardiovascular endurance; it also promotes self-concept that arises from performing the movement confidently. Research done in Indonesia regarding rhythmic and general gymnastics has mostly focused on how the motor skills of children at the lowest level can be enhanced via gymnastic interventions and the teaching strategies used are jump, pivot, and balance with the idea that these are the most crucial skills needing development (Wahyuniati et al., 2023). There is yet to be any Indonesian study published that explores the same subject matter of motor abilities that would concern balance, at the level of teachers, since it is they who would be giving out the content.

This issue is important as professional development is only as good as the information it is based on. Teacher professional development studies conducted within the regular teaching context have revealed that targeted, sustained teacher programs result in significant improvements in teachers' understanding of and competence in physically literate activities, as well as in their students' physical literacy achievements (Wright et al., 2020). In order to achieve these changes effectively, the first step would be to identify the areas of teacher physical literacy that need improvement; without content-specific and domain-disaggregated baseline data, the professional development of teachers to teach rhythmic activity could end up being designed on assumed rather than proven shortcomings.

Overall, the scarce representation of teacher physical literacy research by scholars from teacher-level or outside of high-income systems; the main use of qualitative rather than physically literate quantification of domains within the Indonesian literature; the lack of physical literate teachers' data on contents such as rhythmic activity motivate this paper. Describing the ways physical literacy strengths and weaknesses are distributed across cognitive, motor control, balance, and environmental domains among elementary physical educators who teach rhythmic activity is the basis for developing the training in-service that is specifically adapted to physical literacy of each of them and their teaching situations, in contrast to generic in-service that is the same for everybody.

Specifically, this study aims to quantify, through a cross-sectional survey design using a 20-item questionnaire administered to 52 elementary physical education teachers in Yogyakarta, Indonesia, the physical literacy levels of these teachers in respect of rhythmic activity instruction, across five theoretically supported domains: cognitive understanding, motor competence, balance movement ability, object control, and environmental participation.

To our understanding, this study is one of few that have assessed Indonesian physical education teachers' mastery of physical literacy especially when it comes to rhythmic activity content through a domain-disaggregated methodological approach, thereby enhancing a literature mostly either student-centered or involving mainly qualitative research methods regarding teacher physical literacy. This paper not only creates an empirical baseline of the content-specific data that future intervention initiatives can refer to, but also proposes a foundation for the identification of needs to be addressed in designing in-service professional development that mainly addresses teacher's domain(s)-motor competence and balance, that most likely hinder teachers' ability to offer top-quality rhythmic activity instruction.

Method

This study utilizes an approach grounded in quantitative methods. It gathers the necessary data through the methods of survey or questionnaires whereas it employs descriptive analysis method to the collected data that will eventually be converted in the forms of percentages.

A total of 52 physical education teachers who teach in Yogyakarta, Indonesia, were selected as sample for this study. Questionnaire-based survey is the method that will be used to gather data on Physical Literacy through Rhythmic Activity by the primary PE teachers themselves.

Table 1 <Instrument Grid>

Variable	Factor	Indicator	Question Number
Physical Literacy through rhythmic activity in elementary physical education	Cognitive domain	Self-confident	1, 2, 3, 4, 5
		Motivation	
		Understanding	
	Domain of motor competence	Locomotor	6, 7, 8, 9, 10, 11
		Coordination	
		Balance movement	
	Control objects	Hold balance for 3 counts	12, 13
		Deviant motion	
		Symmetrical motion	
	Environmental domains	Classroom participation	14, 15, 16, 17
		Outside classroom participation	18, 19, 20
		Field participation	

Results and Discussions

This research was conducted by using simple physical education teachers as participants. The number of subjects in the study was fifty-two physical education teachers in the Yogyakarta region, Indonesia. In order to gather responses, we have opted the mode of sending out the questionnaires online.

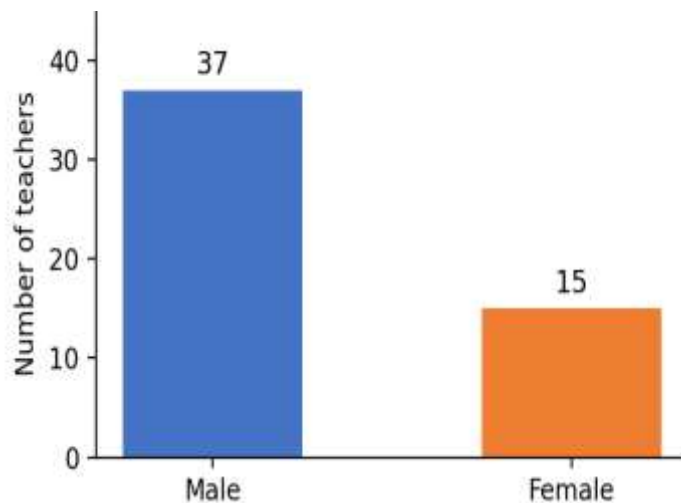


Figure 1 <Subject Characteristics>

Table 2 <Subject Characteristics Data>

Sex	Number
Male	37
Female	15
Total	52

Results indicated that physical literacy in the cognitive domain was 53% in the high category, motor competence domain was 42% in the medium category, physical balance movement was 39% in the medium category, object control was 55% in the high category, and the understanding of the environmental domain was approximately 51% in the high category. *[Catatan editor sesuai komentar reviewer: mohon dilengkapi ukuran sebaran (SD/ rentang) untuk tiap domain pada Tabel 3, serta uji statistik inferensial (mis. ANOVA atau Kruskal-Wallis)*

untuk menguji signifikansi perbedaan antar domain.] Prior literature indicates that physical education teachers' own ability and the physical literacy outcomes of the students they teach are closely linked (Yin et al., 2024); in order for these activities to have a better impact, the physical literacy of physical education teachers is needed to be reinforced, especially through physical activities that are part of the curriculum. Whitehead is a physical education specialist and WHO representative, whose career has revolved around teaching and public health work in different settings in the UK as well as internationally. She is particularly known for the physical literacy concept that she introduced as a tool for the development and enhancement of physical activity. Whitehead (2001) described physical literacy as 'a lifelong motivation, confidence, physical competence, knowledge and understanding to maintain physical activity throughout life'.

Table 3 <Research Data>

Aspect	Score	Max Score	%
Cognitive domain	556	1040	53%
Domain of motor competence	520	1248	42%
Balance movement ability	162	416	39%
Control objects	460	832	55%
Environmental domains	320	624	51%
Total	2018	4160	49%

Physical literacy is nowadays a widely influential and accepted concept. It is not only found in the teaching and learning area but also the policy areas of sport and recreation, particularly in Canada. The idea is based on a metaphor that equates movement skills with reading or learning a language skills. Using theory as justification for applying metaphor, it has allowed many interpretations and redefinitions of physical literacy.

We suggest that the physical literacy concept which includes and reunites interpretation re-understanding is a helpful means. It supports physical literacy to be understood theoretically, studied practically, and to serve as a measuring tool. In phenomenological physical literacy Physical literacy is described as a concept that came out of philosophical considerations of monism, existentialism, and phenomenology (Whitehead, 1998). Phenomenology, to be short: it is the study of experience from the point of view of the person experiencing, and it involves that we become the world through our experiences. The concept apparently includes and is consistent with our dimensions that, together, can make us human beings, and in which we as humans are active agents of change in our environment, thereby, we live out our own potential. He was not only against the current physical educational mechanists view and sports coach which sees people as parts that are taken out and put into each other again in a new better version. Beside that, he said that mind and body can't be separated one from another (monism), that human beings create their own being through life's experiences, and that we can only understand experiences through what others live them. In other words, each individual has a unique life history that is the foundation from which we derive all that we are. Therefore, physical educators should help individuals understand the inherent capacities through their embodiment: to be able of sensing, describing and articulately expressing significant personal qualities that affect the individual's movement. When through physical movement both cognitively and emotionally engaged, people can look forward to a life of full health and happiness, where physical activity remains an appreciated and regular part of the life (International Physical Literacy Association, 2012).

The focus of this paper is that most gymnastic activities in elementary schools are rhythmic and are called rhythmic movements. For instance, Rhythmic activity or dancing in physical education is seen as a way for the developing child to become physically active (Lin, 2014). It is a great challenge for kids to be able to express themselves through movement. Rhythmic activity is movement pattern or basic movement of rhythm with movement that results in beautiful motions. The learning of rhythmic activity at the elementary level is done through reflective movement or by copying what has been seen in the surroundings as the main characteristics of children in this age group of the elementary school child. We through rhythmic activities attempt to perform rhythms of movement as naturally occurring and fitting with the child's nature and characteristics. The effect of rhythmic activity on the improvement of balance, physical endurance, strength, and cardiovascular endurance, flexibility, and vital capacity, as mentioned, has increased. In other words, a study by Novotná & Slovakova (2016) indicates that rhythmic activity has positive effects on increasing balance, physical endurance, strength, cardiovascular endurance, flexibility, and vital capacity.

Physical education should be included and taught in compulsory lessons starting from primary to secondary schools because this clearly indicates the essential role of physical education in the education and development of future human capital, mostly the students, by means of physical activities which are

conducted in a planned and systematic manner that can develop, enhance or support different learning areas like cognition, affectiveness and psychomotor skills. Besides the fact of aligning the basic competencies of the students, the teachers teaching physical education in primary schools also need to modify or adjust the ways of delivering the lesson in accordance with the unique features of each developmental stage of the child" age as stated by Husdarta & Saputra (2011). The stages of child development for primary school students can be explained here as:

Table 4 <Motoric Development of Elementary School Age Children>

Age	Selected Behavior
6	Girls are superior in terms of movement accuracy, while boys are in activities that use a lot of energy and are not too complex. Jump if possible. Children are able to move their bodies and jump nimbly.
7	Balancing on one leg without looking becomes possible. The child is able to walk on a two-inch wide bar. Children are able to jump and jump accurately into small boxes. Children are able to do jumping jack exercises accurately.
8	A child has a 12 pound grip. The number of children who are willing to participate in games, both boys and girls, is the largest at this age. Children are able to jump in varying rhythms in a 2-2, 2-3 or 3-3 pattern. Girls can throw a small ball 40 feet.
9	Boys can run at a speed of 16.5 feet per second. Boys are able to throw a small ball 70 feet.
10	Kids can catch and intercept small balls that are thrown a certain distance. Girls can run at 17 feet per second.
11	The widest jump for boys is 5 feet and for girls is 4.5 feet.

From the table, it is understood that children's motor skill development remains in an increasing trend. A child who is older can be considered more mature as the child is ready to perform different kinds of physical activities, which involve more difficulties. So, physical literacy must be taught at very early stages as the basic of physical movement. Initially, physical literacy must be introduced at the teacher level in order teachers to master it and then be able to transfer the knowledge to the students. Should the teacher and student successfully understand and apply physical literacy skills that could help them in various situations of life in order to achieve better performances, then physical literacy might be considered as a basic factor that supports them. A physically literate person will find it easy and comfortable to maintain physical activities over a period of time (lifestyle).

They have found that these results agree with the theories about how physical literacy works that say physical competence is the main aspect affected by insufficient specific practice, not motivation or knowledge, within a physical-literacy framework (Cairney et al., 2019). That the students here scored low in balance and overall motor competence further supports the idea that motor skills competency is a primary channel through structured physical activity to both short and long term health outcomes, and explains why motor skills shortcomings by teachers are pedagogically significant (Gao et al., 2021). In gymnastics-related areas specifically, physical fitness characteristics like balance and flexibility have been considered as core skills that can be developed through instructional programs designed carefully (Gaspari et al., 2024). Also, literature studies on motor competence interventions in schools indicate that continuous structured practice rather than occasional exposure is necessary to produce the desired change in those indicators (Moon et al., 2024). School physical literacy promotion programs have demonstrated through targeted curricular interventions that teachers who were well-prepared could really bring students' results to a level that has a big impact (Grauduszus et al., 2024), which makes an even stronger argument for implementing the subject-specific in-service training suggested here. The physical competence measurement can be done in a more fine-grained way by dividing it into separate parts, which one can teach as well, instead of thinking of it as an indivisible number. That is, in the measurement framework, different components are considered. An example is the tool used in the Canadian Assessment of Physical Literacy Second Edition and PLAYself, which is a physical assessment instrument (Longmuir et al., 2018; Jefferies et al., 2021). That way, the method aligns quite well with the five-domain structure of this article. Locally, in Indonesia, teacher training models specifically tailored for the country's physical educators have shown that quality assurance, validated, and systematically developed teacher training sessions can easily be introduced without overhauling school systems (Mu'arifin & Narmaditya, 2022), which is practical evidence to support the targeted teacher development that is suggested here.

Conclusions

The survey result indicated that out of all teachers who took part in the study their cognitive domain literacy was 53% which is regarded as high, their motor competence literacy level was 42% medium, balance movement ability was 39% medium, their object control was 55% high, they were 51% environmentally literate, and this was regarded as high in terms of literacy levels. According to the findings of the data analysis, it is reasonable to say that there is a demand for physical literacy development specifically in rhythmic activities in the motor competence and balance movement ability aspect among physical education teachers in Yogyakarta, Indonesia. In order to enhance the effectiveness of learning, it is necessary to carry out improvement activities that address learning material which deals with rhythmic activities.

[Catatan editor sesuai komentar reviewer: mohon dicantumkan ambang batas (cut-point) atau standar normatif yang tervalidasi yang digunakan untuk mengklasifikasikan tingkat literasi sebagai "tinggi" atau "sedang", serta dasar (mis. effect size atau analisis kesenjangan) yang mendukung prioritas pengembangan profesional pada aktivitas ritmik dibanding domain lain. Bagian Ucapan Terima Kasih (Acknowledgments) telah dipisahkan dari bagian Kesimpulan sesuai struktur naskah yang lazim.]

Acknowledgments

First of all, I want to say a big thank you to the Faculty of Sports Science at Yogyakarta State University which has been funding our DIPA FIK UNY research and also the students of the Faculty of Sports Science. Because of you, we have managed to carry out this research without any problems.

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