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Pedagogical Content Knowledge and Health Literacy Integration Among Indonesian Elementary School Physical Education Teachers: A Descriptive Survey

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Abstract

Contextual evidence on teachers' pedagogical knowledge and health literacy integration is needed to identify priorities for elementary physical education. This study described pedagogical content knowledge (PCK) and reported health literacy integration alongside teacher attitudes, supporting factors, barriers, and facilities in East Lombok, Indonesia. A descriptive cross-sectional survey involved 69 purposively selected elementary physical education teachers. Data were collected using a 45-item questionnaire with four-point responses and analyzed using descriptive statistics. Under the reported coding, PCK (M = 1.97, SD = 0.32) and health literacy integration (M = 1.79, SD = 0.34) were categorized as low, with integration recording the lowest mean. Attitudes and facilities were also categorized as low, whereas supporting factors and barriers were high. Support scores partly reflected training needs rather than available support. Prominent barriers concerned teaching competence or experience, instructional materials, and the prioritization of health literacy. Facility availability was rated more favorably than suitability and safety. Interpretation is constrained by self-report data, purposive sampling, and uncertainty about reverse scoring of two negatively worded items. This preliminary profile identifies priorities for targeted professional development, contextualized teaching materials, and safer learning facilities, without establishing causal relationships or verifying classroom practice.

Keywords: pedagogical content knowledge; health literacy; physical education; elementary school teachers; professional development.

INTRODUCTION

Physical Education, Sport, and Health (PJOK) in primary school provides an opportunity to develop movement and fitness competencies while linking movement experiences with health learning. Research on children's motor development shows the importance of paying attention to the relationship between movement competence, fitness, and involvement in physical activity, although the relationships between these components are not always simple or uniform in each child (Drenowatz et al., 2021; Lopes et al., 2021; Mazzardo et al., 2024). Therefore, the success of PJOK is not enough to be reviewed from students' movement skills or activeness, but it is also necessary to consider learning opportunities that help students understand the benefits, risks, and health choices in daily activities. WHO guidelines place regular physical activity and reduction of sedentary behaviors as important components of school-age children's health (World Health Organization, 2020).

Within this framework, physical literacy and health literacy are complementary concepts, but they are not interchangeable. Physical literacy encompasses the integration of physical competencies, motivation, confidence, and knowledge and understanding that support engagement in physical activity throughout life (Liu & Chen, 2021; Valle-Muñoz et al., 2025). Its application in physical education emphasizes learning experiences that connect physical, affective, and cognitive aspects, not just the achievement of motor skills (Houser & Kriellaars, 2023). Meanwhile, health literacy is

concerned with the ability to access, understand, assess, and use health information to make appropriate decisions. Thus, health literacy goes beyond mastery of health facts because it also involves the ability to communicate, consider information, and apply it in life situations (Nutbeam & Lloyd, 2021). A review of school-based physical literacy interventions emphasizes the importance of the physical, cognitive, and affective domains, although the quality of the research evidence and assessment procedures still varies (Grauduszus et al., 2024).

In this study, the integration of health literacy is interpreted as the inclusion of health learning goals and experiences into movement learning, especially related to nutrition, hydration, safety, injury prevention, and healthy living habits. This integration is not a replacement for the purpose of movement learning or simply the delivery of health advice. Students need to have the opportunity to understand the reasons for an action, discuss information, and consider choices relevant to their lives. A study by Peralta et al. (2021) in a secondary school in Australia placed the development of health literacy in the relationship between learning activities, curriculum demands, and the overall school approach. The findings provide a pedagogical foundation for integrating health literacy, while still requiring adjustments to the development and learning experiences of elementary school students. An analysis of primary school curricula in three regions shows that opportunities to develop critical health literacy are not always balanced with interactive literacy, so these goals need to be explicitly planned (Evans et al., 2025).

Pedagogical Content Knowledge (PCK) is a relevant conceptual foundation for understanding teachers' ability to design these integrations. PCK connects material understanding by representing, sorting, and adapting it so that it can be learned by students in a specific context. In physical education, this knowledge is reflected in the selection of movement tasks, adjustment of difficulty levels, the use of explanations and demonstrations, the provision of feedback, and learning assessments (Montoya Grisales et al., 2023). For health-oriented learning, the professional competency framework also includes health knowledge, health-specific pedagogical knowledge, and teacher beliefs and motivation (Lohmann et al., 2023). Research on prospective physical education teacher educators also shows the importance of paying close attention to beliefs about health when developing collaborative learning planning (Hapke et al., 2021). Research on prospective teachers shows the relationship between content mastery and PCK applied in PJOK teaching at the elementary school level (Kim, 2021).

The development of PCK requires attention to the connection between content mastery and teaching experience. Research on content training in throwing learning in elementary schools and game-based teacher teacher education programs shows that strengthening content knowledge can be accompanied by changes in teaching and learning skills in the context studied (Chang et al., 2020; Farias et al., 2022). Studies on lesson studies have also identified its potential as a vehicle for PCK development through planning, observation, and reflection on learning (Marques Santinha et al., 2024). However, evidence on the learning of movement skills cannot be directly considered evidence of the ability to teach health literacy. More specifically, Peralta et al. (2022) reported that physical education and health teachers in secondary schools felt an increased understanding of critical health literacy after participating in professional development tailored to their needs. This supports the importance of competency development that explicitly links health content with pedagogical practice. In a pilot study on tennis learning in primary school high grades, content knowledge workshops were followed by teacher teaching improvements and student skill learning outcomes (Tsuda et al., 2021).

In addition to teacher knowledge, the conditions of learning implementation need to be

considered. HealthLit4Kids research in primary schools' places teachers' professional learning and school community involvement as an important part of student health literacy development (Nash, Cruickshank, et al., 2021). School standards that promote health also include learning environments, curriculum, partnerships, and support of school organizations (WHO & UNESCO, 2021). In line with this approach, the framework proposed by Wiedermann et al. (2024) links health education with teacher training, learning materials, and cooperation between parties. This literature provides a reason to map teacher attitudes, supporting factors, barriers, and infrastructure as contextual conditions, without first considering them as strong or weak causes of health literacy integration. The global report on the quality of physical education also highlights challenges in the availability of trained teachers, learning opportunities, and inclusive access; these international findings cannot be used to infer the specific conditions of schools in the research sample (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2024).

The synthesis of previous research shows differences in focus that need to be bridged empirically. The PCK study examines knowledge for teaching content, pedagogical adjustments, and competency formation in education and professional socialization of prospective teachers (Montoya Grisales et al., 2023; Zhang et al., 2024). Meanwhile, the study of school health literacy programs focuses on learning design, professional development, and school environment involvement (Nash, Patterson, et al., 2021; Peralta et al., 2022). The conceptual relationship between teacher competence and health education has been recognized, but the differences in focus, subject, and context of the research are not enough to determine the needs of elementary school PJOK teachers in East Lombok. Therefore, a joint mapping of PCK and the integration of health literacy reported by teachers is needed, along with the contextual conditions of its implementation. This need for evidence places the contribution of the research on an integrated empirical profile, not on the claim that the relationship between pedagogy and health literacy has never been studied. A survey of physical education teachers in Lithuania measured teachers' personal health literacy, which is conceptually different from the practice of integrating health literacy in learning that was the focus of this study (Sukys et al., 2024).

Based on this description, the problem of this research is how to profile PCK and the integration of health literacy of elementary school PJOK teachers in East Lombok, as well as how the condition of teachers' attitudes, supporting factors, obstacles, and accompanying infrastructure. The research aims to describe the two main constructs based on teachers' self-reports and map their four contextual dimensions. The contribution of the research is to provide a six-dimensional profile that distinguishes pedagogical knowledge, reported integration practices, and learning implementation conditions as the basis for determining the priorities of professional development and school support. This profile is not intended to establish cause-and-effect relationships or confirm the quality of classroom practice and student health literacy directly.

Novelty this research lies in the preparation of an integrated empirical profile through six dimensions, namely PCK, teacher attitudes, integration of health literacy, supporting factors, obstacles, and learning facilities and infrastructure. This multidimensional approach provides a contextual picture of the needs for teacher competency development and learning support in East Lombok Regency. The scope of the study included 69 elementary school PJOK teachers who were purposively selected through a descriptive quantitative survey with a cross-sectional design. The study aimed to identify the conditions of the six dimensions based on teachers' self-reports as the basis for the preparation of professional development priorities and the improvement of the quality of PJOK learning. This study did not examine causal relationships or directly measure students' health

literacy skills.

METHODS

Design and Samples

This study uses a descriptive quantitative approach with a cross-sectional survey design to describe the pedagogical content knowledge (PCK) of PJOK teachers, the integration of reported health literacy, and four contextual dimensions: teachers' attitudes, supporting factors, obstacles, and infrastructure. The unit of analysis is elementary school PJOK teachers; self-report data is not used as evidence of classroom practice observation or students' health literacy ability. This design describes the situation in a period, not changes over time or cause-and-effect relationships (Wang & Cheng, 2020).

The target population was elementary school PJOK teachers in East Lombok Regency. A total of 69 teachers were selected through purposive sampling based on experience in planning, implementing, and evaluating PJOK, so the findings do not automatically represent the entire teacher population (Andrade, 2021). Respondents consisted of 62 males (89.9%) and 7 females (10.1%); all of them had a S1 Sports Education/PJOK education. A total of 46 teachers (66.7%) had participated in training or workshops related to PJOK and health literacy. The affordable population size and the calculation of the initial sample needs have not been documented; therefore, the number of 69 is treated as an analyzed sample, not as a basis for statistical precision claims as emphasized by Lakens (2022).

Research Instruments

The instrument is in the form of a self-report questionnaire with 45 items and numerical responses on a scale of 1–4. The six dimensions include PCK (I1–I12; 12 items), attitudes towards health literacy (I13–I18; 6 items), health literacy integration (I19–I29; 11 items), supporting factors (I30–I35; 6 items), barriers (I36–I39; 4 items), and PJOK facilities (I40–I45; 6 items). PCK measurement includes content understanding, selection of learning strategies, activity adjustments, and health message delivery (Montoya Grisales et al., 2023; Lohmann et al., 2023). The PCK instrument development study also emphasizes the importance of measurement quality evidence before scores are interpreted as competency (Montoya et al., 2022).

Health literacy integration is measured from teachers' reported practices in associating movement activities with nutrition, hydration, safety, injury prevention, healthy habits, and decision-making (Nutbeam & Lloyd, 2021; Peralta et al., 2022). This score is not the result of a student health literacy test (Summanen et al., 2022). Verbal labels of responses, instrument adaptation processes, and evidence of validity and reliability are not yet available in the research documentation. Therefore, the score categories are used descriptively, paying attention to the prudence of scale development (Jebb et al., 2021) and measurement transparency as discussed by Flake and Fried (2020).

Data Collection and Ethics

Data was obtained by filling out a questionnaire in one period. All 69 respondents had complete answers on 45 items with a score range of 1–4. The detailed timing and distribution mechanism of the questionnaire, the number of teachers invited, and the number who refused have not been documented; therefore, the response rate was not calculated (Sharma et al., 2021). Teacher names were not used in the analysis, but documentation of participation consent, confidentiality management, and ethics review status was not available, so no claims were made about ethical consent (British Educational Research Association, 2024).

Data Analysis

The data are analyzed descriptively through frequency, percentage, mean, and standard deviation. The score of each dimension is obtained from the average of the items in that dimension;

the aggregation of scores does not by itself prove the uniformity of the constructs measured (McNeish & Wolf, 2020). The percentage score is calculated as (mean dimension/4) × 100%; this number indicates the proportion of the score to the maximum score, not the percentage of teachers who master a competency. The interpretation categories of scores 1–4 are presented in Table 1.

Scoring followed reported encoding. Two negative items, I16 and I28, did not yet have documentation confirming whether a score reversal had been performed; combined interpretations of the two associated dimensions required caution (Vigil-Colet et al., 2020). A high score on the barrier dimension indicated a stronger constraint; while item I31 on the supporting factor described the need for training, not the support that was already available. Categories were not used to diagnose individual competence. The analysis did not include correlation tests, regression, or causal influences; details of the standard deviation calculation were not yet available for verification.

Table 1. Descriptive category of average score

Average score range	Category
$1{,}00 \leq \bar{S} \leq 1{,}75$	Very low
$1{,}75 < \bar{S} \leq 2{,}50$	Low
$2{,}50 < \bar{S} \leq 3{,}25$	High
$3{,}25 < \bar{S} \leq 4{,}00$	Very High

Note: Categories are descriptive summary rules based on score ranges, not competency thresholds that have been validated against external criteria. Ranges 1–4 are divided into four sections of equal width; classification rules are used for descriptive interpretation.

RESULTS

Based on the reported coding and interpretation rules, *pedagogical content knowledge* (PCK) and health literacy integration in 69 PJOK teachers were both in the low category. Health literacy integration had the lowest numerical average among the six dimensions. In the contextual dimension, supporting factors and barriers were in the high category, while teachers' attitudes and facilities were in the low category. The reported standard deviation values were most present in the obstacle dimension. A summary of statistics is presented in Table 2.

Table 2. Descriptive statistics of the research dimension

Dimensi	N	Rata-rata	SD	Persentase terhadap skor maksimum	Kategori
Knowledge of pedagogical content of PJOK teachers	69	1,97	0,32	49,18%	Low
Teachers' attitudes towards health literacy	69	1,93	0,38	48,37%	Low
Integration of health literacy in PJOK learning	69	1,79	0,34	44,83%	Low
Supporting factors for health literacy integration	69	2,66	0,43	66,61%	High
Barriers to health literacy integration	69	2,66	0,82	66,49%	Height—strong resistance
PJOK facilities and infrastructure	69	2,21	0,39	55,31%	Low

Note: SD = standard deviation. Percentage is the average conversion to the maximum score, not the percentage of respondents in each category. Categories follow the descriptive rules of the study and are not validated competency thresholds. In the barrier dimension, high scores indicate stronger barriers. The interpretation of the combined attitude score and health literacy integration is limited by the undocumented status of the I16 and I28 score reversals. Supporting factors also include training needs so that not all items represent the support that is available.

Knowledge of pedagogical content of PJOK teachers

The PCK dimension obtained an average of 1.97 and was included in the low category. The item score ranged between 1.72 and 2.29. The understanding that PJOK needs to develop movement

skills as well as health understanding was the indicator with the lowest score (I1; 1.72). On the other hand, the inclusion of elements of health literacy in learning objectives, teaching modules, or lesson plans had the highest score (I10; 2.29), but remained in the low category. Thus, there were no indicators of PCK that reached the high category according to the research rules. The difference between the two indicators is the difference in self-report scores, not the results of direct examination of the teacher's understanding or learning documents.

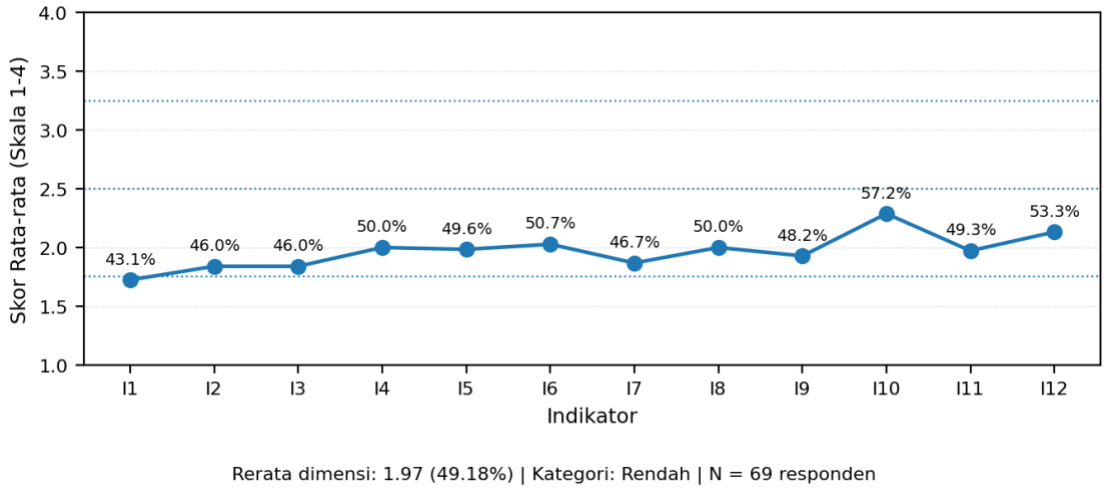


Figure 1. Dimensions of Pedagogical Content Knowledge of PJOK Teachers

Teachers' attitudes towards health literacy

The attitude dimension obtained an average of 1.93 and was categorized as low based on the reported coding. Among the positive items, the belief that PJOK can help students build healthy living habits early on had the highest score (I14; 2.16). Lower scores were found in the belief that health literacy is an important part of the PJOK (I13; 1.81) and the confidence to explain simple health material (I17; 1.87). I16 is a negative statement about the teacher's workload so it is not interpreted in the same direction as the positive item without clarity of the scoring key. Therefore, the description of the results mainly emphasizes positive indicators whose meanings can be directly distinguished.

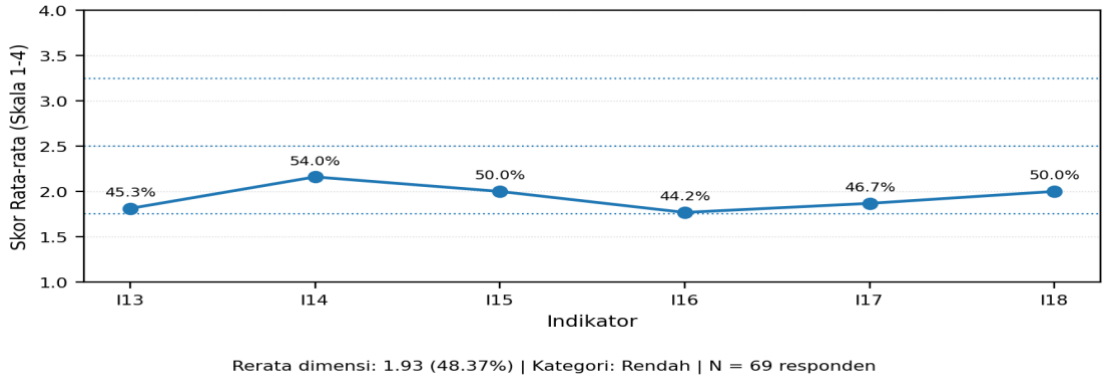


Figure 2. Dimensions of Teachers' Attitudes to Health Literacy

Integration of health literacy in PJOK learning

The dimension of health literacy integration obtained an average of 1.79. Among the positive items, the explanation of heating and cooling in the context of injury prevention had the highest score (I22; 1.93). The lowest score was found in the explanation of safety rules before physical activity (I21; 1.70), followed using daily life examples to explain healthy behaviors (I27; 1.74). The last two indicators were in the very low category. These findings showed a low score of teacher reports on several activities that associated health materials with PJOK learning experiences. However, the

average dimension still requires caution because it includes I28 that is negatively oriented and the status of score reversals has not been documented.

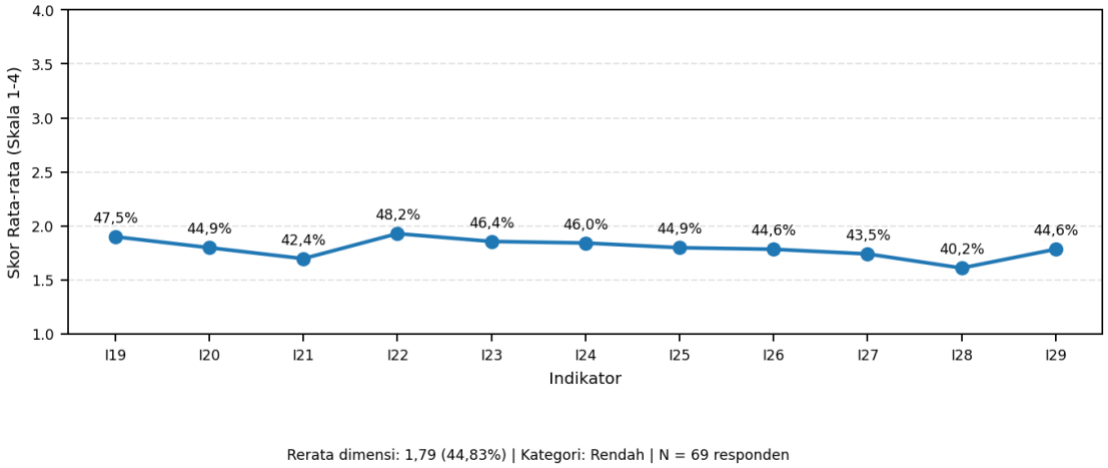


Figure 3. Dimensions of Integration of PJOK Teachers' Health Literacy in Learning

Supporting factors for health literacy integration

The supporting factors obtained an average of 2.66 and were in the high category. The opportunity to work with classroom teachers, UKS, health centers, parents, or the community had the highest score (I35; 2.81). Experience participating in training or workshops related to health literacy integration received a score of 2.51, while special training needs obtained a score of 2.75 (I31). Thus, this group of items contains information about support opportunities as well as development needs. A high score cannot be interpreted as evidence that all support is available or that collaboration opportunities have been realized in learning activities.

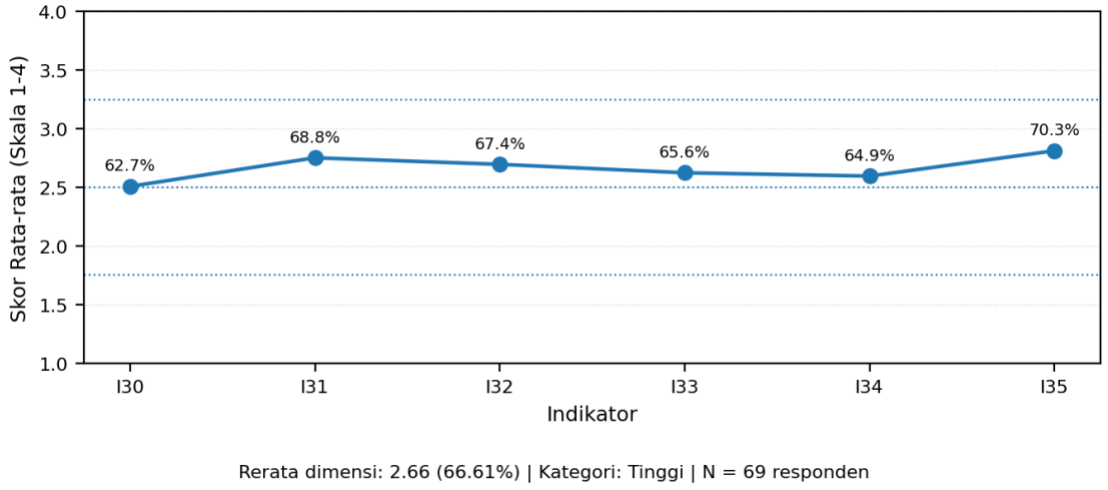


Figure 4. Dimensions of Supporting Factors for Health Literacy Integration

Barriers to health literacy integration

The dimension of barriers obtained an average of 2.66 with SD of 0.82. Limitations in teacher competence or experience were the obstacles with the highest scores (I38; 2.83), followed by limitations in teaching materials (I37; 2.72) and health literacy which were not yet the top priority in the implementation of PJOK (I39; 2.67). All three were in the high category. Time allocation barriers had a relatively lower score (I36; 2.42) and were included in the low category. The sequence illustrates the difference in the average of reported barriers, not the difference in the magnitude of the influence of each obstacle on learning practices.

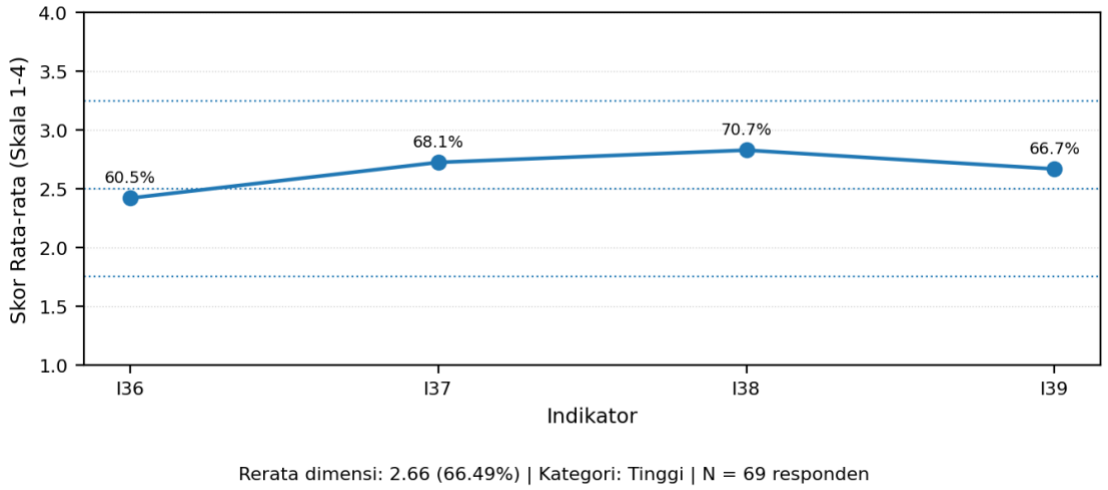


Figure 5. Dimensions of Health Literacy Integration Barriers

PJOK facilities and infrastructure

Facilities obtained an average of 2.21 and were in the low category. The assessment of the availability of PJOK facilities in general was relatively high (I40; 3.17), but the assessment of the feasibility of equipment, field safety or activity space, adequacy of the number of facilities, health learning facilities, and safety equipment was in the low category. The score percentages of the five indicators ranged from 50.0% to 52.2%. This pattern shows a difference between the perception of the existence of facilities and the assessment of the quality and suitability for learning. All these assessments came from teacher reports, not the results of facility inspections.

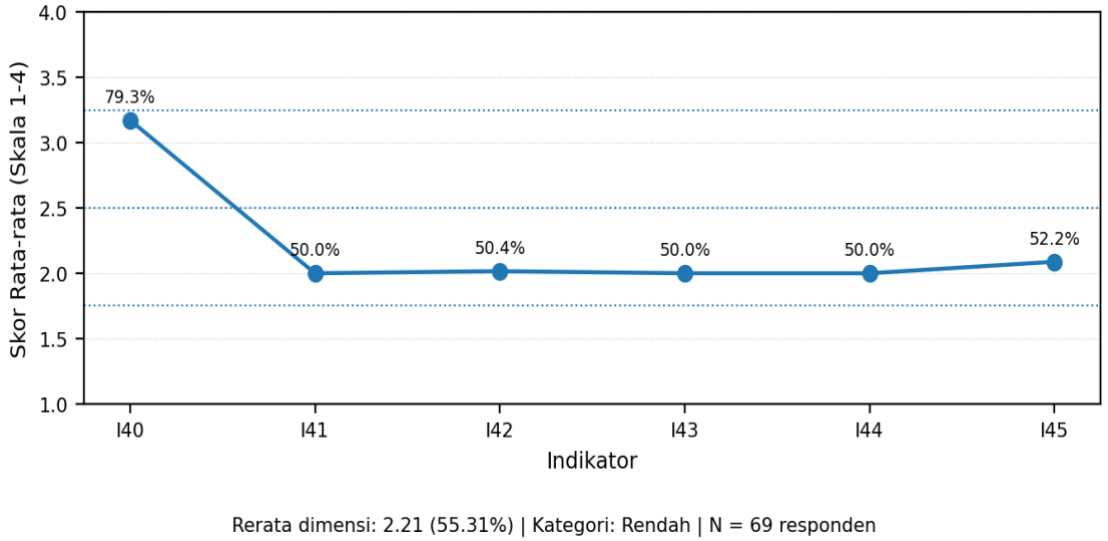


Figure 6. Dimensions of PJOK Facilities and Infrastructure

DISCUSSION

PCK and the association of movement goals with health learning

The research profile places PCK and health literacy integration as two areas that require attention in the development of PJOK learning. However, the appearance of low scores in both does not prove that low PCK leads to low integration. The study did not test the relationship between variables, and the measurement of PCK represents a teacher's assessment of their understanding and ability, not a test of knowledge or performance observation. Therefore, the contribution of the findings lies in the identification of reported needs, not the determination of the causative mechanism.

The low I1 score is relevant to the question of how teachers understand the relationship between movement goals and health goals. Meanwhile, a relatively higher I10 score indicates that the inclusion of health elements in planning is better assessed than the conceptual understanding represented by I1. This difference needs to be further examined, not directly considered as a gap between administration and practice. Conceptually, PCK includes decisions about content, student characteristics, learning representation, and adjustment to context, so its existence cannot be inferred from the inclusion of learning objectives alone (Montoya Grisales et al., 2023; Ward & Kim, 2024). The Delphi study of the competencies of health education teachers also emphasizes the integration of material mastery, specific didactics, social-emotional skills, and professional development (Paakkari et al., 2024).

Intervention research provides a foundation for the development of content-focused PCK and teaching practices. Chang et al. (2020), in throwing learning in elementary school, reported changes in teacher-implemented PCK and improvement in student skills after the development of content knowledge and understanding of student development. Farias et al. (2022) also found an increase in prospective teacher-specific content knowledge and student game performance through a two-stage teacher education program. However, both studies focused on movement skills learning. The findings support the importance of content-based pedagogical development, but do not directly prove the effectiveness of the same approach for health literacy integration.

A reflective and experience-based approach can be considered as a form of development that needs to be tested. Marques Santinha et al. (2024) emphasized the potential of lesson studies in the development of PCK of prospective physical education teachers. Zhang et al. (2024) identified the relationship between PCK and professional socialization in prospective teachers as well as the importance of field experience in the process. In the context of this study, the implication is the need for activities that link planning, implementation, observation, and reflection to health learning. However, evidence on prospective teachers cannot be used to conclude the conditions or needs of all teachers who have taught without contextual adjustments.

Health literacy as an explicit learning goal

Low health literacy integration scores cannot be interpreted as low student physical literacy or lack of movement learning. Physical literacy includes competence, motivation, confidence, knowledge, and involvement in physical activity; the pedagogical approach can also include cognitive, social, and affective experiences (Liu & Chen, 2021; Houser & Kriellaars, 2023). Health literacy emphasizes the ability to acquire, understand, assess, and use information to make health decisions (Nutbeam & Lloyd, 2021). The two can complement each other, but this study did not directly measure physical literacy or student health literacy.

Safety indicators and the use of everyday life examples provide a more specific direction of development than simply adding health information. Learning can be designed for students to explain the reasons for a safety rule, discuss options in everyday situations, and distinguish reliable health information. The proposal aims to connect understanding to decision-making, not just remembering health messages. In comparison, Peralta et al. (2021) found more interactive than critical health literacy activities in a learning program at one secondary school in Australia. The findings show the benefits of examining the type of learning experience that was designed but were not the basis for classifying students' health literacy in this study. A study of the development of the health literacy rubric shows that analytical learning objectives can be elaborated into more explicit activities and assessments, even though the evidence comes from a case study in one school in Australia (Ormes et al., 2025).

Teacher attitudes and the relevance of professional development

Scores in I13, I14, and I17 show that beliefs about the benefits of CHD, recognition of the importance of health literacy, and confidence in explaining health materials need to be differentiated. These three cannot be summarized as a matter of professional commitment alone. Lohmann et al.'s (2023) model places knowledge, beliefs, motivational orientation, and self-regulation as components of health-oriented professional competence. In educators-to-be teachers in Germany, Hapke et al. (2021) found that some beliefs are relatively stable, while beliefs that are closer to practice can change through collaborative planning. This supports attention to concrete pedagogical experiences, not just the delivery of information about the importance of health. Research on primary school classroom teachers in Tasmania found that health literacy learning often relies on everyday understanding and still requires the reinforcement of specific pedagogical knowledge (Cruickshank et al., 2023).

The context of the sample showed that 66.7% of respondents had attended training or workshops related to PJOK and health literacy, while 94.2% reported receiving teacher certification allowances. However, the information did not include the intensity, depth of material, implementation time, or follow-up of the training. Allowance acceptance was also not a measure of health content mastery. Since there was no analysis available that linked these characteristics to individual scores, the results of the study could not be used to state that the training or certification was successful or failed to improve HCP and health literacy integration.

More direct evidence on the development of health literacy pedagogy is provided by Peralta et al. (2022). In a program for nine physical education and health teachers in three secondary schools in Australia, participants reported an increase in understanding of health literacy after participating in professional development tailored to their learning program. Teachers also identified the need for learning resources and follow-up to support sustainable change. The findings provided a reason to assess the appropriateness of the training content and mentoring, not just the status of having attended the training. However, the experiences-based results of the secondary school teachers still required adaptation and testing on primary school PJOK teachers. Evaluation of the HealthLit4Kids workshop showed that participants reported increased understanding and confidence in teaching health literacy, while also identifying limited learning time and resources (Otten et al., 2023).

Support, barriers, and collaboration opportunities

High scores on supporting factors and barriers should not be understood as opposites. The two dimensions measure different aspects, and supporting factors include I31 on training needs. The combination of support opportunities with development needs limits the meaning of the average score. Methodologically, the formation of a combined score requires the suitability of the content of the item and the basis of interpretation, not just the similarity of the numerical range (McNeish & Wolf, 2020). Therefore, I31 is more appropriately discussed as a training need, while I35 as a collaboration opportunity that has not necessarily been realized.

Competency barriers, teaching materials, and learning priorities provide context for these needs. Similarities in the types of issues were found in the HealthLit4Kids study by Nash, Cruickshank, et al. (2021), which analysed the reflections of 84 teachers in five primary schools in Tasmania. The issues that emerged related to the overall school approach, student engagement, and professional development. The international review of Nash, Patterson, et al. (2021) also emphasized multicomponent design, curriculum integration, teacher development, and parent and community engagement. These similarities lie in the type of implementation needs, not the equivalence of barriers or school conditions between Tasmania and East Lombok. Studies of primary school PJOK specialist teachers in Australia reported the risk of marginalization of health education when the division of responsibilities between PJOK teachers and classroom teachers is unclear (Cruickshank et al., 2024).

The cooperation opportunities reported in I35 can be the starting point for the development of support that is closer to learning, for example through the preparation of shared teaching materials and the alignment of classroom activities with school health services. Wiedermann et al. (2024) propose a health education framework that links teacher training, learning, and community engagement. However, the framework is the result of a narrative study in the context of South Tyrol, not evidence of the effectiveness of interventions in East Lombok. In this study, the allegation that support is not in line with needs is a hypothesis that needs to be tested, not a proven causal explanation. The review of primary school teacher professional development also emphasizes the integrated, adaptive, collaborative, and supported nature of training by school leaders, but its effectiveness in the context of East Lombok still needs to be tested (Otten et al., 2024).

Feasibility of facilities and implications for learning

The difference between the facility availability score and the feasibility, safety, and adequacy score shows the importance of differentiating the facility inventory from its usefulness in learning. However, this data has not proven that facility conditions cause low integration of health literacy. Teacher assessments can be used as a basis for determining aspects that need to be examined through direct observation, especially the condition of equipment, the safety of the activity space, the adequacy of the number of students, and safety equipment.

In Making Every School a Health-Promoting School, WHO and UNESCO (2021) place a safe, maintained, accessible, and on-demand physical environment as part of a health-supporting school. This framework reinforces the rationale for assessing facilities based on the quality of their use, rather than mere existence. A practical implication for the research sample is the need to examine facilities that are linked to learning objectives and tasks. The proposal does not mean that all schools have the same damage or lack of facilities, as the condition of each school has not been verified.

Overall, the research indicators support the formulation of a development agenda that links movement–health understanding, learning experience design, teaching materials, teacher mentoring, and facility inspections. Its success needs to be assessed through observable changes, such as the suitability of objectives with learning activities, the quality of teachers' explanations, and students' ability to give reasons for health choices. These agendas are implications that can be tested based on needs profiles, not interventions whose effectiveness has been established by this survey. Approaches that connect content, context, and practice evaluation are in line with the discussion of PCK by Ward and Kim (2024) and the development of health literacy pedagogy by Peralta et al. (2022).

Research limitations and interpretation limitations

This study has limitations in design, sample selection, and measurement. The cross-sectional survey did not follow individual changes over time, while the self-report did not verify the quality of learning through observation. The purposive selection of 69 respondents in one district also limited generalization to all PJOK teachers. Thus, the results mainly apply as a profile of the sample studied, not an estimate of the condition of the entire population or evidence of cause-and-effect relationships (Wang & Cheng, 2020; Andrade, 2021).

Information on the type of school and grade level taught was not available, so variations based on these contexts could not be analyzed. The study also did not measure students' health literacy, study learning documents directly, or conduct facility inspections. In addition, the basis for calculating the standard deviation could not be verified from the summary of available results. Therefore, the size of the elementary school in the barrier dimension was not used to infer the existence of a particular group of teachers or determine the cause of the variation in response.

The most pressing limitation of measurement is the unclear status of the reversal of scores I16 and I28 and the mixing of training needs with available support on the supporting factor dimension. The direction of the item and the coding key must be checked on this study dataset before the

combined scores, categories, and interdimensional sequences are treated as the results. The examination is not just the agenda of the next research. Research by Vigil-Colet et al. (2020) shows that the orientation of the item can affect the psychometric nature and interpretation of measurements.

Documentation of validity, reliability, and response labels is also inadequate to interpret scores as validated measures of competence. Transparency of instrument development and scoring decisions is necessary for the relationship between constructs and scores to be evaluated (Flake & Fried, 2020; Jebb et al., 2021). Taking these limits into account, the contribution of the research is to provide an initial mapping of pedagogical needs and implementation conditions reported by teachers, as a basis for further examination through instrument evaluation, learning observation, and measurement of student learning outcomes.

CONCLUSION

Based on the reported coding, a survey of 69 elementary school PJOK teachers in East Lombok Regency showed that pedagogical content knowledge (PCK) and health literacy integration were in the low category. The profile was accompanied by low scores of teachers' attitudes and facilities as well as high barriers mainly related to teacher competence or experience, availability of teaching materials, and health literacy priorities in learning. Although the supporting factors obtained a high category, the score did not indicate that all support was adequate because some indicators measured training needs, not the support available. The assessment of facilities also showed that the availability of facilities in general was not synonymous with feasibility, safety, and adequacy. The contribution of this study is to provide an initial profile of the two main constructs along with the four contextual dimensions as the basis for identifying teacher development needs and learning support. The findings are descriptive patterns based on self-reports on the sample studied, not evidence of cause-and-effect relationships, quality of classroom practice, or students' health literacy ability. Interpretation of combined scores, especially on the dimensions of attitude and health literacy integration, still requires verification of negative item scoring before stronger measurement conclusions can be established.

RECOMMENDATION

The professional development of PJOK teachers is recommended to focus on the ability to connect movement learning goals with health understanding, explain the reasons for safety rules before physical activity, and use daily life examples to train healthy decision-making. Training needs to be accompanied by assistance in setting goals, selecting activities, providing feedback, and assessing student understanding, with the support of teaching materials that are in accordance with the characteristics of elementary schools. Schools are advised to clarify the goals of health literacy in learning planning and take advantage of collaboration opportunities with classroom teachers, UKS, health centers, parents, and communities. Infrastructure improvements need to be based on direct checks on the feasibility of equipment, safety of activity spaces, sufficiency of facilities, and safety equipment, not just an increase in the number of facilities. In this study, the key to I16 and I28 scoring and the suitability of combining I31 in the dimension of supporting factors need to be verified before the results are treated as final findings; Calculations and interpretations should be updated if the examination finds inconsistencies. Further research is recommended to use instruments with evidence of adequate validity and reliability, combine surveys with classroom observations, study of learning documents, and interviews, and expand the scope of the sample to include the type of school and grade level taught. The effectiveness of professional development also needs to be tested through changes in learning practices and student learning outcomes, not just changes in teacher perception.

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