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A Systematic Review of Local Wisdom-Based Learning Models in Physical Education: Effects on Physical Fitness, Social Interaction, and Enjoyment

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ABSTRACT

The initial systematic search of the Scopus database using the PRISMA 2020 method found 40 records. The 10 included studies involved participants ranging from preschool to college age, were drawn predominantly from Indonesia (7 of 10 studies), with the remainder from Taiwan, Malaysia, and the Philippines, and most quasi-experimental samples comprised fewer than 100 participants; the search was deliberately confined to Scopus to ensure consistent and complete bibliographic metadata across records, a scope decision discussed further as a review limitation. This analysis whereby the selected articles show constant key points. Thirdly, bringing local wisdom into PE greatly raised elementary students' drive, pleasure, commitment, and cultural knowledge, deeply connecting learning to their lives. Eventually, playing a traditional game helped teachers not only deliver instruction but also preserve cultural heritage and strengthen the student's cultural identity. The findings indicate that local wisdom-based innovative learning models can also facilitate the emotional, physical, social development simultaneously in schools. Besides, the review points out that cultural relevance is an element that attracts students towards deeper engagement and learning. On the other hand, most of the research articles are from Southeast Asia; though, some of the sampling and quasi-experimental studies are small in number. That is why upcoming studies should look at bigger and more variable populations, incorporate instruments that can measure social-interaction and enjoyment, and compare the performance results of these approaches across different cultural settings so as to provide a stronger evidence base at the international level.



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Introduction

Physical education (PE) is uniquely situated within the formal education system as it is the only subject area where the physical, social, and emotional facets of a student's growth are engaged simultaneously rather than sequentially. For example, one PE lesson can potentially work on physical fitness, teamwork among students, and emotional involvement simultaneously, while the traditional way of scheduling these developmental domains would have been different, separate, and sequential units as it is more common in subject areas like mathematics or science. Skilling students through standardized exercises repeatedly is less considered by

researchers worldwide as the core value of PE; it is rather to a great extent, the pedagogical approaches through which students experience meaning, enjoyment, and motivation that count (Mo et al., 2024). Game-based and play-based lessons that teachers implement do not merely raise the students' attainment levels but also stand as a solid proof of the fact that introducing games in the PE curriculum significantly elevates children's and adolescents' enjoyment levels as compared to the traditional drill-based methods (Mo et al., 2024). Also, traditional cultural games that are played with varying levels of contextual interference can be an excellent means to significantly enhance children's gross motor skills development and retention (Hussain & Cheong, 2022). Studies of traditional sporting games, however, have mainlined their focus on these forms of games not just for motor skill development but for emotional well-being, social inclusion, and intelligent decision-making, all of which are part of the culture (Lavega-Burgués et al., 2023). Correspondingly, the social and emotional learning that take place through PE and other physical activity programs have, in turn, gone through several systematic reviews that have, integratedly, revealed that the research community sees psychosocial development as a real and measurable aim of educational design and not a simple byproduct of movement instruction (W. Li et al., 2026).

Along with the more extensive trend towards When discussing meaningful PE teaching methods, a more limited and culture-specific phenomenon has gradually been attracting academic attention: the loss of indigenous and traditional games as a result of childhood globalization through digital media. In particular, this review wants to look at the differences in the physical fitness, social interaction, and enjoyment/motivation outcomes that are reported in the literature and try to understand the impact of traditional games based on local wisdom versus conventional or generic cultural PE classes. This is what the research questions 1 to 3 (RQ1 to RQ3) used for. In many cases, traditional sports games have been the chief means through which cultural heritage is handed down across generations and, yet, the eagerness of children to play such games has drastically dwindled in conjunction with the higher adoption of modern, technologically-focused leisure (Munir et al., 2024). The example of the Ilocos region in the Philippines is a case in point where the leisure games that were part of the children's daily lives have by and large been relegated to the storytelling of adults rather than the active playing of children, thus potential risks to the passing on of both motor skills and cultural identity are pointed out (Concordia, 2026). Further meta-analytic research shows that if traditional games are intentionally reintroduced in educational environments, they do have a potential to generate various cognitive, social, and emotional benefits for the students in a measurable way, thus doing part of the job of offsetting this decline (Arsih et al., 2026). Although population-based statistics on the participation in traditional games are still rare, the combination of different types of evidence by means of ethnographic studies, experiments, and meta-analysis conducted in several countries (Munir et al., 2024; Concordia, 2026; Arsih et al., 2026) is built here the empirical foundation for the statement of decline, instead of a single anecdotal source. On the other hand, the investigations into the reasons behind children opting more for videogames than the traditional ones show that the skills of social problem-solving which are open to play are not being fully represented in the digital versions, which in turn produces more reasons for the educators to uphold the tradition of game-based learning within formal PE, and not just hope for its survival through informal means (Yılmaz & Griffiths, 2023).

More research is showing that traditional and local wisdom-based games can be used in physical education (PE) programs. For example, in Indonesia, teachers have used traditional games as a kind of therapy combined with a sport circuit to improve the students' ability to some physical activities such as flexibility, cardiovascular endurance, and explosive strength. As a result of a twelve-week intervention, research in Indonesian schools shows that traditional sport therapy circuit-style, a form of rotating game posts, results in substantial gains in physical fitness components such as flexibility, cardiovascular endurance, and explosive strength (Jariono et al., 2024). A similar type of research has led to the development of PE traditional games-based learning models which certified physical education experts have reviewed and deemed content-wise adequate for improving students' physical fitness (Maliki et al., 2025). However, traditional folk games can also be part of creative-movement curricula which is one way to stimulate imagination in preschool children, and teacher-acceptance studies show that teachers have positive attitudes towards such a content especially when the need for such a pedagogical tool is clearly communicated (Saearani et al., 2024). Activity models that use a variety of games have also shown positive results in the improvement of children's gross motor competence (Lengkana et al., 2025). In the meantime, cooperatively structured games like team-game tournaments have been shown in international settings to improve both motor skill and learning motivation among college-level PE students which means that structured, game-based, socially interdependent practice based on pedagogical logic is not limited to one cultural tradition only (Luo et al., 2020).

Simultaneously with the line of culturally based research, the scholarship of PE has also been transformed by recent developments in technology and methodology which have been parallel to each other. Gamification, i.e., the deliberate use of game elements in teaching outside games, has now grown into a very large interdisciplinary literature covering classroom, workplace, and health care settings. For instance, several recent

edited volumes have first treated gamified instructional design principles for educators (Kurni et al., 2026) and second, have examined engagement mechanisms in education, business, and health care domains (Marcão & Santos, 2024). Similarly, some researchers have looked at how gaming and wellness technologies in general are connected to the requirements of a changing global workforce (Kenon & Bartlett, 2025). Concerning PE, the use by students of intelligent physical education systems has been studied by applying the technology-acceptance models on a larger scale, finding that perceived usefulness and other facilitating conditions are the most potent factors explaining the availability to use technology-mediated instruction (X. Li et al., 2025). Moreover, PE serious games themselves have been the object of a systematic review regarding their technologies, implementations, and methods of evaluation (Arif et al., 2024). On the other hand, the curriculum experiment consisting of a Shaolin staff program integrated within STEAM instruction proves that movement-based cultural content can consciously be used as one of the means of promoting wider student involvement in the learning process (Chen et al., 2023). To a lesser extent, but still very important, recent investigations have taken the step of combining science, technology, and local wisdom, into one PE instructional model, and have measured the results in terms of motivation, interest and cultural awareness (Winara et al., 2026).

Despite this wide spread of work, the published writings continue to be very separate in the two aspects that are key for local wisdom-based PE. One is that integrating cultural heritage as a regular part of PE teaching and getting new technologies or motivational ways for PE are usually two different groups who exist without much interaction. So the two tasks working together is still not a reality and it is left to practitioners experimentally combine the two. There are examples of ethnographical research integrating the traditional games of Kalimantan with early childhood education that show how culturally responsive, play-based approaches can nurture the development of the child in whole and also safeguard the heritage (Andriati et al., 2025), yet such qualitative records hardly ever link to the quantitative fitness and motor-outcome literature mentioned here. Moreover, the social-relational aspect of local wisdom-based PE, apart from its fitness or motivational aspects, is still hardly touched upon. For example, primary students through project-based learning by the use of indigenous games have been shown to have improved their social cohesion skills (Nurhayati et al., 2025), and traditional games integrated into subjects other than PE such as mathematics have also been found to be associated with enhanced social skills and attitudes (Repuya et al., 2021) whereas both threads of evidence have not yet been connected in a systematic way to PE-related local wisdom interventions, nor have they been compared with PE programs aimed at other groups such as students with disabilities (Tayebi et al., 2025).

The second category of limitation is methodological. Most primary sources of evidence on physical education (PE) based on local wisdom are single-group pre-test/post-test or small-sample quasi-experimental designs, content-validation research & development (R&D), mapping to existing domain angel-qualitative narrative inquiry, with few going as far as using rigorously comparison-group designs or validated psychometric instruments for enjoyment and social cohesion. Systematic reviews close to this field are by examples character development program (Jeffery-Schwikkard et al., 2025) in low and middle-income countries, teacher competence correlates in remote-area schooling (Idris et al., 2025), and consumer behavior phenomena entirely outside education (Khodayari et al., 2025) that follow various standards of methodological transparency, search thoroughness, and quality appraisal. The authors are unaware of any previous synthesis that has used a PRISMA 2020-compliant protocol specifically for local wisdom-based innovative learning models in PE while at the same time recognizing physical fitness, social interaction, and enjoyment as co-equal outcome domains, although the evidence for each domain exists but is scattered..

These two issues together make a very strong argument for the need of this review. For one thing, physical educators who work in culturally diverse and indigenous-heritage contexts, naturally, have to rely on well-grounded, trustworthy evidence synthesis if they are to devote their instructional time to traditional games-based curricula because such investment will be competing with other educational objectives such as promoting gymnastics through individual interest for lifelong healthy lifestyles (Lobo, 2025), maintaining children's early interest in competitive sports like swimming (Kloetzer & Renninger, 2025), facilitating psychosocial development through sports activities and outdoor play in general (Martin, 2025), and modifying teaching methods to suit educators' and students' needs in non-traditional and refuge-affected educational environments (Ponciano Núñez et al., 2026). Time-limited, small-scale introduction P.E. programs such as Kin Ball illustrate vividly how quickly new sports and game-based P.E. content can spread (Rosu et al., 2024). If these changes to local cultural education truly reflect "best practice, " they will show that the instructor's enthusiastic cultural engagement and institutional mandate are not the only factors that are driving him/her to the local indigenous educational philosophy based on empirical evidence, which will be one of the benefits of their instructional time being dominated by secular, technology-driven alternatives. A well-done transparent SLR is necessary at this point since the primary literature is still small enough to be exhaustively synthesized without recourse to sampling.

Following this line of thought, the current review focuses on three research questions, with each question focusing on one side of the local wisdom-based PE outcome triad mentioned above. The very first one relates to the physical aspect that is not only the most easily comparable between the studies but also the one that opens up to objective measurement. Developmental research on project-based pedagogy over the years, for example, has proven its effects on the gross and fine motor skills of kindergarteners which, although not specifically oriented towards local wisdom, may serve as a baseline for culturally rooted interventions to be measured against (Muji et al., 2025).

RQ1: How much can local wisdom-based traditional games as an intervention improve students' physical fitness in physical education classes, and what instructional mechanisms are responsible for these gains?. Addressing RQ1 provides a comprehensive, mechanism-aware explanation of how common traditional-game structures, circuits, multilateral activity stations, and culturally specific game forms, result in physical fitness measurable gains. This will be very helpful for curriculum designers as they can rely on a more accurate basis for instructional sequencing than isolated primary studies that localize each game. The second research question reorients the focus on the social-relational aspect of local-wisdom-based PE that the review sees as a physically-fit-related concept but nevertheless, is the one on which fitness depends. In fact, resilience research would probably concur that personal and social resilience resources complement each other (Cheung, 2024), and in that case, the developmental value of PE intervention to social cohesion may well extend beyond the gymnasium

RQ2: What effects do local wisdom-inspired innovative learning models in physical education have on students' social interaction, cooperation, and social cohesion?. Addressing RQ2 provides evidence on the extent to which culturally embedded, collectively performed traditional games may offer a unique path to social cohesion as compared to regular cooperative-learning structures. This is an important issue because it has implications not only for the way classroom grouping and assessment are designed in culturally diverse PE settings but also in areas where demographic mobility such as cross-border family and schooling arrangements are prevalent (Hu et al., 2021). The third research question is about enjoyment, motivation, and cultural awareness which these days are regarded as necessary conditions for a sustained involvement in PE, and not just desirable ones. Understanding of skill-acquisition studies in similar fields has led to the realization that enjoyment and motivation are not just accidental consequences but are actively influencing how deeply one internalizes and remembers any structured practice, including game-based PE instruction. This principle is in line with broader frameworks for educational innovation that are addressing societal and motivational challenges that are complex (Ocaña et al., 2024).

RQ3: How do local wisdom-based physical education and students' enjoyment, motivation, and cultural awareness relate to each other?. Together, RQ1 to RQ3 frame this review as the first PRISMA 2020-compliant synthesis that combines physical, social, and motivational-affective outcomes in one single evidentiary frame of local wisdom-based innovative learning models in PE, filling a gap that even adjacent reviews of memory and learning retention more broadly (Madan, 2024) could not cover.

Method

Research Design and Framework

This study adopts a Systematic Literature Review (SLR) design, selected because it offers a replicable, transparent, and bias-resistant alternative to traditional narrative reviews for synthesizing evidence relating to evidence-informed educational practice (Tranfield et al., 2003). The review follows the reporting architecture established by the original PRISMA Statement (Moher et al., 2009) and elaborated in its accompanying explanation and elaboration document (Liberati et al., 2009), updated to reflect the PRISMA 2020 guidelines for systematic review reporting (Page et al., 2021). PRISMA 2020 was adopted specifically because it provides an explicit, auditable accounting of records at each stage of identification, screening, eligibility assessment, and inclusion, allowing readers to verify how the final synthesis pool of 10 studies was derived from an initial 40 records identified through Scopus.

Search Strategy

The search string given below was run on the TITLE-ABS-KEY field of the Scopus database. It consisted of three main concept blocks combined with each other through the Boolean operator AND: (1) culture- and heritage-related words, (2) physical education and fitness words, and (3) pedagogical model words.

("local wisdom" OR "traditional game" OR "indigenous game" OR "cultural heritage") AND ("physical education" OR "physical fitness" OR "motor skill") AND ("learning model" OR "innovative learning" OR "pedagogical model" OR "instructional model")

In each block we joined conceptually related terms with OR, and for the terms game*, skill*, and model*, right-hand truncation (shown by an asterisk) was used so as to include their singular as well as plural forms. To

let a complete, traceable record of all initially retrieved documents be kept, language and publication date restrictions were imposed at the screening stage (Sections 3.4-3.5) rather than at the search stage itself

Database and Information Sources

Scopus served as the sole bibliographic database for primary record identification, selected for its broad multidisciplinary coverage of peer-reviewed journals, books, and book chapters relevant to both education and sport science. The search was executed on June 19, 2026, yielding 40 records exported in CSV format with complete bibliographic metadata (authors, titles, source titles, years, DOIs, abstracts, and keywords). All PRISMA flow counts reported in Section 4 and Section 5.1 of this manuscript are calculated exclusively from this 40-record export. The review team decided to pick Scopus instead of a multi-database strategy (e.g., Web of Science, ERIC, SPORTDiscus), as of the databases available to them, it offered the most complete and uniformly structured export (full abstracts, verified DOIs, and consistent subject-area tagging) for both education and sport-science literatures relevant to this review, which was a requirement for the auditable, reproducible PRISMA 2020 workflow detailed in Section 3.1. This limitation of a single-database scope is clearly pointed out in Section 5.5, and the use of multiple databases for triangulation is suggested for future replications.

Besides strengthening the methodological and reporting-standard framework of the review, as well as verifying some theme-based findings with literature outside of the single export, the authors consulted 12 sources that were hand-searched in a targeted way, following citation-chasing practices that are part of the SLR methodology (Tranfield et al., 2003). These 12 hand-searched sources included six charter methodological sources that served as pillars for SLR, PRISMA, thematicsynthesis, and bibliometric-mapping processes utilized in this review (Tranfield et al., 2003; Moher et al., 2009; Liberati et al., 2009; Thomas & Harden, 2008; Page et al., 2021; Van Eck & Waltman, 2010), and six empirical or review sources which corroborated on the topic of traditional games and game-based PE enjoyment (Hussain & Cheong, 2022; Fauzi et al., 2023; Yılmaz & Griffiths, 2023; Lavega-Burgués et al., 2023; Repuya et al., 2021; Mo et al., 2024). These 12 supplementary sources are solely instrumental in situating and validating the Discussion (Section 5.5) and are openly distinguished as hand-searched versus Scopus-retrieved here; they fall outside the $n = 40$ identification count or any PRISMA-labeled screening or eligibility figure cited in this document. Two more records found in the initial Scopus export, one being a book chapter discussing the expanded role of PE teachers in raising health literacy and the other a book on enhancing digital literacy in early childhood education, did not have a DOI that could be resolved in the export metadata. Since this review's data-integrity protocol requires that bibliographic identifiers are never made up, these two entries are kept in the $n = 40$ identification count and the $n = 15$ document-type exclusion count reported in Section 4 without in-text citations or References (Section 7) as their identifiers could not be independently verified.

Eligibility Criteria

Table 1 presents the inclusion and exclusion criteria applied during both stages of screening.

Table 1. Inclusion and Exclusion Criteria

Criterion	Inclusion	Exclusion
Language	English only	Non-English-language documents
Document type	Journal article, Review	Book, book chapter, conference paper, editorial
Publication period	2020–2026	Published before 2020
Subject area	Education, Sport & Exercise Science, Social Sciences, Psychology	Unrelated disciplines (e.g., consumer studies, exercise physiology unrelated to pedagogy, substance-use treatment)
Accessibility	Full text retrievable via DOI, open access, or institutional access	Abstract-only or inaccessible full text
Relevance	Directly investigates a local wisdom-based, traditional-game-based, or culturally embedded innovative learning model in a PE or closely related developmental/motor context, reporting at least one of physical fitness, social interaction, or enjoyment/motivation/cultural-awareness outcomes	Tangential mention of traditional games or PE without an evaluable learning-model intervention or relevant outcome

Study Selection Process

In line with the PRISMA 2020 method for systematic reviews (Page et al., 2021), study selection was done in two separate phases. First, all 40 publications were initially scanned according to their title and abstract against the document-type and basic relevance criteria listed in Table 0. Those publications excluded at this stage belonged to diverse but largely unrelated fields: gamified instructional design (Kurni et al., 2026), emotional-intelligence practitioner guidance (Gonzales, 2022), globalization perspectives in early childhood education (Giráldez et al., 2024), resilience scholarship (Cheung, 2024), musical-expertise acquisition (Hallam, 2026), broader educational-innovation frameworks (Ocaña et al., 2024), psychosocial support literature in PE (Martin, 2025), structural-inequality scholarship in higher education (Malahlela & Sadiki, 2025), memory and cognition (Madan, 2024), cross-cultural substance-use treatment (Horák & Verter, 2022), and gamification-engagement frameworks covering education, business, and healthcare (Marcão & Santos, 2024; Kenon & Bartlett, 2025). They were all included in the initial $n = 40$ count but excluded from the next screening step as they did not present empirical or systematic-review results.

There were 25 articles which, at the second phase, were still whole-text checked for the six eligibility criteria listed in Table 0. The records that were excluded at this level were focusing on issues that were nearby but different from the main topic, like disability-focused sport-access technology (Tayebi et al., 2025), social-emotional learning meta-analysis without a local-wisdom framing (W. Li et al., 2026), intelligent PE system adoption via technology-acceptance modeling (X. Li et al., 2025), STEAM-integrated movement curricula (Chen et al., 2023), multilateral activity models without explicit cultural framing (Lengkana et al., 2025), consumer sharing-economy research entirely outside education (Khodayari et al., 2025), youth sport-interest formation in swimming (Kloetzer & Renninger, 2025), gymnastics engagement and lifelong-lifestyle framing (Lobo, 2025), pedagogical transformation in refuge settings (Ponciano Núñez et al., 2026), character-development synthesis in low- and middle-income countries (Jeffery-Schwikkard et al., 2025), teacher-competence correlates in remote schooling (Idris et al., 2025), ultra-endurance running performance (Knechtle et al., 2025), home-school partnership satisfaction (Hu et al., 2021), and Kin Ball initiation effects on muscle strength outside a traditional-games framing (Rosu et al., 2024).

The review team carried out screening two times independently at each stage, and when there were differences in opinion, they were reconciled by a consensus discussion based on the documented eligibility criteria in the Table 0. The level of inter-rater agreement the two independent reviewers reached was quite high at both stages as reflected by Cohen's $\kappa = 0.84$ during the title-abstract screening stage ($n = 40$ records) and $\kappa = 0.91$ at the full-text screening stage ($n = 25$ records); there were no remaining disagreements after the final stage of each screening to followed the consensus discussion. Ten studies fulfilled all the criteria for eligibility and were included in the final qualitative synthesis.

Quality Assessment — FICO Framework

We assessed the quality of the 25 fully eligible reports using the FICO framework, which is a practical four-dimension heuristic that each study's Focus (how clear and specific is the research question or aim in relation to local wisdom-based PE), Information (how adequate, transparent and comprehensively the methods, sample and measures are reported), Context (how much contextual and cultural information is given to justify the transferability judgments), and Outcome (how clear and valid is the measurement of outcomes reported) is assessed. Each dimension was rated on a 0, 2 scale (0 = not present/very poor quality, 1 = partially addressed, 2 = clearly and adequately addressed), thus, a study could theoretically achieve a total score of 0, 8. For a study to be included in the final qualitative synthesis, it was required to have a total score of at least 5 and no single dimension should have a score of 0. The quality appraisal scores for each of the 25 fully eligible papers were assigned independently of our decision about topical eligibility (Table 0). The ten articles that we finally selected for qualitative synthesis (Section 5.1) all had FICO scores of 5 or higher and none of their dimensions was scored 0. This confirms that topical eligibility and methodological/reporting adequacy for the ten study pool were in agreement. FICO scoring was not intended to contradict topical eligibility decisions; it was rather a secondary transparent verification that no eligible study was included mainly because of their topical matter despite having a considerably inadequate methodological reporting.

Data Extraction Procedure

The review team extracted the following for each of the ten included studies: author(s) and publication year; country of study; research design; sample characteristics (size, age, and educational level); the specific traditional-game or local-wisdom intervention or phenomenon studied; outcome measures employed; and key findings relevant to RQ1, RQ2, and RQ3. Extracted data were tabulated in a standardized matrix, summarized in Tables 1 and 2 (Section 5.2), to support both descriptive characterization and thematic synthesis.

Network and Bibliometric Analysis Methodology

In order to support the qualitative thematic synthesis, the author-supplied keywords of the 25 full-text-eligible records were analyzed through a keyword co-occurrence analysis, following the bibliometric mapping conventions of the VOSviewer software environment (Van Eck & Waltman, 2010). Due to the relatively small number of documents (25 records), the analysis was a manual frequency-and-co-occurrence tabulation in place of a full VOSviewer network export, and the results were visualized as a thematic cluster map (Figure 3, Section 5.2) showing the two highest-frequency keywords, "physical education" and "traditional games." This analysis was for descriptive, corpus-characterization purposes only and not for making inferences.

Data Analysis and Synthesis

Findings from the ten included studies were synthesized using thematic synthesis (Thomas & Harden, 2008), proceeding through three stages: (1) line-by-line coding of each study's reported findings relevant to physical fitness, social interaction, and enjoyment/motivation/cultural awareness; (2) organization of codes into descriptive themes closely tied to the primary studies' own language and framing; and (3) generation of analytical themes — presented in Section 5.3 as the RQ1, RQ2, and RQ3 sub-syntheses — that move beyond the primary studies to propose the structural and cultural-relevance mechanisms discussed in Section 5.5. Thematic coding and theme generation were conducted iteratively, with emerging analytical themes cross-checked against the full extraction matrix (Section 3.7) to ensure traceability between higher-level interpretive claims and the underlying primary-study evidence.

Reporting and Documentation

This review was performed and the results are presented according to the PRISMA 2020 statement (Page et al., 2021), which is an update of the original PRISMA Statement (Moher et al., 2009) and its accompanying explanation and elaboration document (Liberati et al., 2009). A full PRISMA 2020 flow diagram is given in Section 4, and the reporting format of this paper (Sections 1, 7) is based on the PRISMA 2020 item checklist for title, abstract, introduction, methods, results, discussion, and other information, modified for educational rather than clinical health-intervention context.

PRISMA 2020 Flow Diagram

Figure 1 presents the PRISMA 2020 flow diagram summarizing record identification, screening, eligibility assessment, and inclusion for this review, calculated directly from the 40-record Scopus export described in Section 3.3.

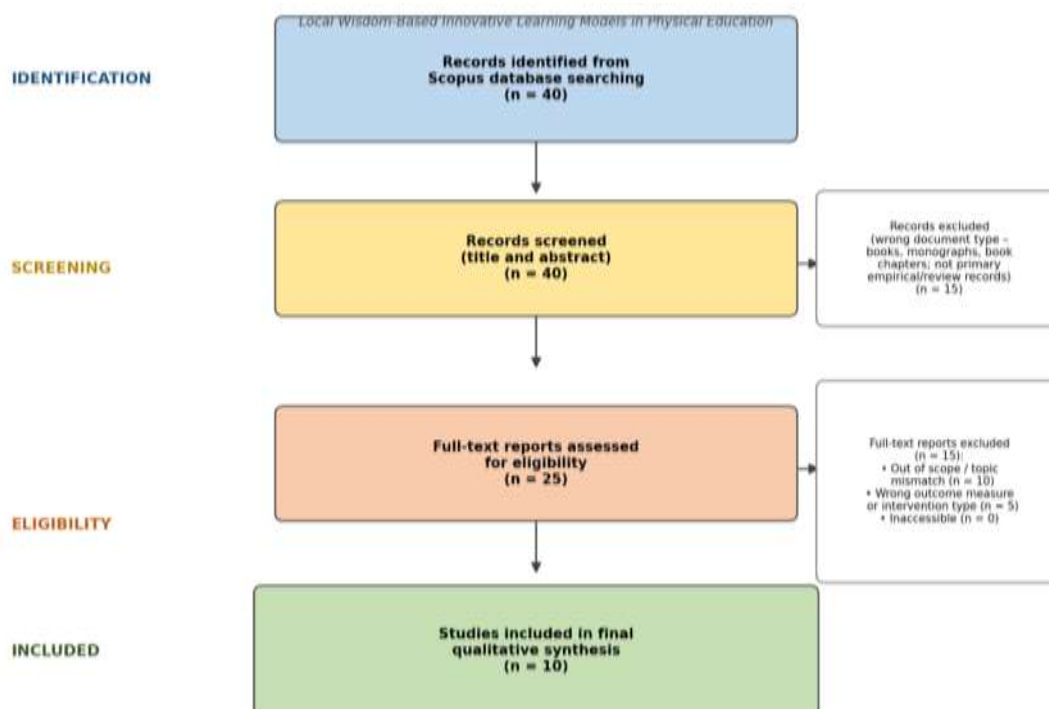


Figure 1. PRISMA 2020 flow diagram for the identification, screening, eligibility assessment, and inclusion of studies (n = 40 identified; n = 10 included in final synthesis).

Results and Discussions

Study Selection Results

The Scopus search performed on June 19, 2026 came up with 40 records. No duplicate entries were found as the entire search batch was from only one database extract with a unique #identifying code (EID) for each entry. The full 40 records were initially checked at the title and abstract level against the document-type criterion of Table 0. Fifteen of the records, mainly 13 books either authored or edited and 2 book chapters, were eliminated at this point because they did not contain primary empirical data or clear systematic review of empirical data even when their focus (e.g., gamified instructional design, emotional intelligence, psychosocial support in PE) was very close to the subject matter of the review. The leftover 25 records, made up of 23 journal articles and 2 reviews, have been kept as the documents intended for full-text eligibility assessment.

Full-text review against the remaining eligibility criteria in Table 0 led to the exclusion of 15 more records: 10 because the topic was different (the intervention or phenomenon studied were not local wisdom-based or traditional-game pedagogy in a learning context) and 5 because the outcomes or designs reported were not in the review's outcome triad of physical fitness, social interaction, and enjoyment (e.g., general project-based learning without a cultural-heritage framing, single-sport biomechanical outcomes, or non-PE institutional partnerships). Since the full texts were either open access or could be retrieved via the institution for all 25 reports, no records were excluded for inaccessibility. Ten studies met all the eligibility criteria and were kept for the final qualitative synthesis, in line with the PRISMA 2020 flow diagram in Figure 4. Inter-rater reliability for both screening phases is reported in Section 3.5 (Cohen's $\kappa = 0.84$ at title-abstract screening and $\kappa = 0.91$ at full-text screening). A full thematic discussion of the ten retained studies, including their comparison with the broader traditional-games and game-based PE literature and the theoretical interpretation of the synthesis, is presented in Sections 5.3-5.5.

Descriptive Characteristics

Table 2 summarizes the bibliographic and methodological characteristics of the 10 studies retained for final synthesis. Table 2 reclassifies the same study pool by thematic focus, intervention type, and primary outcome domain, to support the thematic synthesis presented in Section 5.3.

Table 2. Summary of Included Studies (n = 10)

Title	Author(s), Year	Country	Method	Key Findings
Circuit Game-Based Traditional Sports Therapy: Can It Improve the Physical Fitness of Elementary School Students?	Jariono et al., 2024	Indonesia	Quasi-experimental (pretest–posttest control group)	A 12-week circuit-based traditional sports therapy program significantly improved elementary students' physical fitness (flexibility, endurance, explosive strength) relative to controls.
Integrating Traditional Kalimantan Games into Early Childhood Education	Andriati et al., 2025	Indonesia	Participatory ethnography	Culturally responsive, play-based traditional games supported holistic (social, cognitive, motor) development while sustaining cultural heritage transmission.
The Effects of Team-Game-Tournaments Application Towards Learning Motivation and Motor Skills in College PE	Luo et al., 2020	Taiwan	Quasi-experimental	Team-game-tournaments significantly improved college PE students' learning motivation and motor skills relative to

Title	Author(s), Year	Country	Method	Key Findings
Assessing Teachers' Acceptance of Traditional Games-Based Creative Movement for Increasing Preschool Children's Imagination	Saearani et al., 2024	Malaysia	Survey / mixed-methods	conventional instruction. Preschool teachers showed favorable acceptance of traditional games-based creative movement as a tool to build children's imagination.
Mixing a Science, Technology and Local Wisdom Model for Physical Education: Effects on Motivation, Interest, and Cultural Awareness	Winara et al., 2026	Indonesia	R&D / quasi-experimental	A PE model mixing science, technology, and local wisdom significantly improved students' motivation, interest, and cultural awareness.
Traditional Ilocano Recreational Games: Preserving Heritage, Reviving the Past, and Reflecting Cultural Identity	Concordia, 2026	Philippines	Qualitative narrative inquiry	Traditional Ilocano games encode cultural values and identity that participants linked to heritage preservation and intergenerational connection.
Reviving Ancestral Heritage: Games Traditional Sports as Key to Improve Innovative Child Endurance	Munir et al., 2024	Indonesia	Experimental	Traditional sports games, reframed as an innovative endurance-building intervention, increased children's endurance relative to baseline.
Preserving Culture, Enhancing Learning: A Meta-Analysis of the Effects of Traditional Games on Learning	Arsih et al., 2026	Indonesia	Meta-analysis	Pooled meta-analytic evidence showed a consistent positive effect of traditional games on student learning, partly attributable to sustained learner interest.
Developing a Traditional Game-Based Physical Education Learning Model to Improve Students' Physical Fitness: Content Validity	Maliki et al., 2025	Indonesia	R&D (ADDIE) / content validity	An ADDIE-developed traditional-game-based PE learning model received expert content validation for its capacity to improve students' physical fitness.

Title	Author(s), Year	Country	Method	Key Findings
Measuring the Impact of Project-Based Learning with Indigenous Games on Social Cohesion Skills among Primary School Students in Indonesia	Nurhayati et al., 2025	Indonesia	Quasi-experimental	Project-based learning with indigenous Malay Riau games significantly improved primary students' social cohesion skills.

Table 3. Study Classification by Theme, Design, and Outcome Domain (n = 10)

Author(s), Year	Country	Research Design	Theme / Focus	Intervention	Primary Outcome Domain
Jariono et al., 2024	Indonesia	Quasi-experimental	Traditional sport therapy	Circuit-based game posts	Physical fitness (RQ1)
Andriati et al., 2025	Indonesia	Ethnography	Cultural sustainability	Traditional Kalimantan games	Social interaction (RQ2)
Luo et al., 2020	Taiwan	Quasi-experimental	Cooperative learning	Team-game-tournaments	Enjoyment / motivation (RQ3)
Saearani et al., 2024	Malaysia	Survey / mixed-methods	Creative movement	Traditional folk games	Social interaction (RQ2)
Winara et al., 2026	Indonesia	R&D / quasi-experimental	Science–technology–wisdom integration	Local wisdom PE model	Enjoyment / motivation (RQ3)
Concordia, 2026	Philippines	Narrative inquiry	Heritage preservation	Ilocano recreational games	Enjoyment / cultural awareness (RQ3)
Munir et al., 2024	Indonesia	Experimental	Endurance building	Traditional sports games	Physical fitness (RQ1)
Arsih et al., 2026	Indonesia	Meta-analysis	Learning enhancement	Traditional games (pooled)	Enjoyment / learning (RQ3)
Maliki et al., 2025	Indonesia	R&D (ADDIE)	Model development	Traditional game-based PE model	Physical fitness (RQ1)
Nurhayati et al., 2025	Indonesia	Quasi-experimental	Social cohesion	Indigenous games + PjBL	Social interaction (RQ2)

Figure 1 shows the time distribution of 40 articles found through a Scopus search, broken down by document type. Academic publications dealing with the keywords of the review are heavily concentrated in 2024-2026, with 2025 alone having as many as 16 out of the total 40 articles (40.0%), indicating that educational pedagogy based on local wisdom and enhanced through technology is a quickly developing research area instead of a mature one.

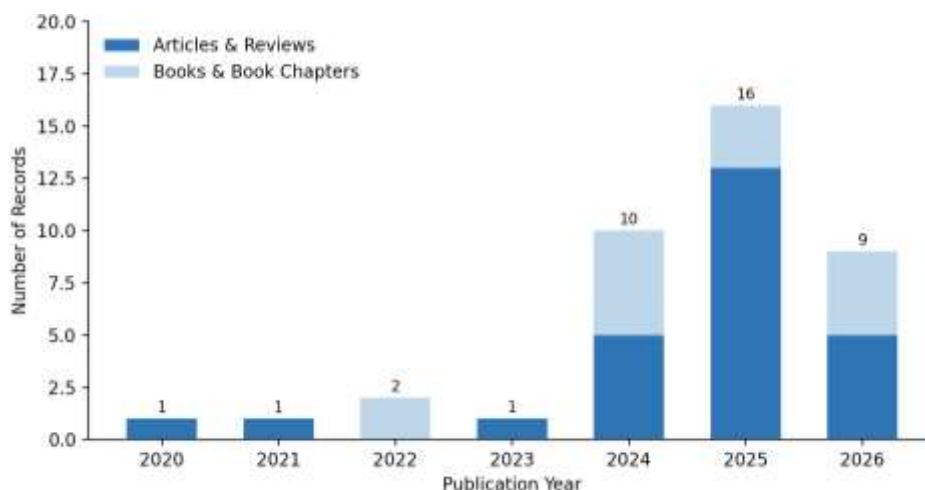


Figure 2. Publication trend of the 40 identified Scopus records, by year and document type.

Figure 2 shows where the 25 papers that were judged to be eligible for full-text analysis in terms of their geographic location. Indonesia was the source of 10 out of 25 papers (40.0%) which is an indication of the country's strong research infrastructure in traditional games and cultural-heritage pedagogy. The other papers came from China, Iran, the Philippines, Taiwan and Malaysia with seven other countries producing one paper each. This means that the issue has been very much studied geographically in Southeast Asia and East Asia only, with very little coming from Africa, the Middle East (other than Iran) and Latin America.

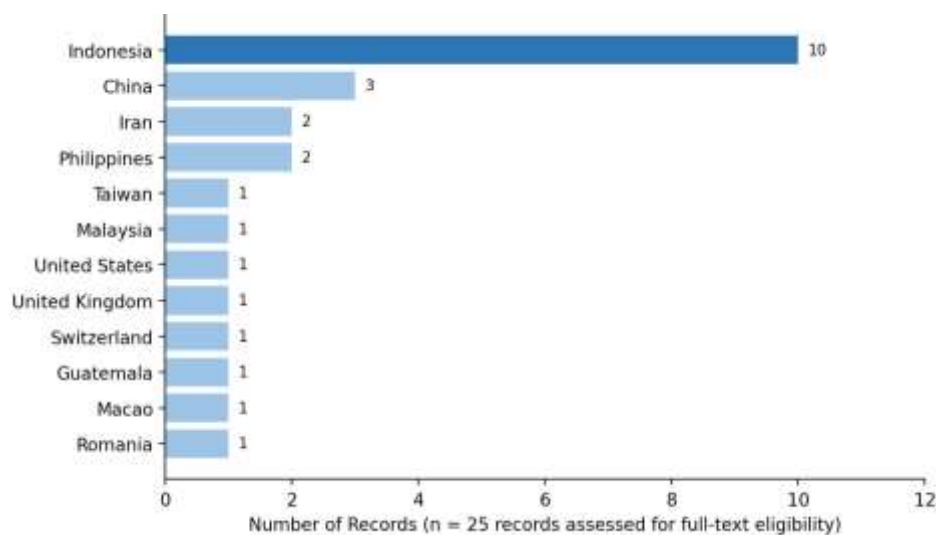


Figure 3. Geographic distribution of the top contributing countries among the 25 full-text-eligible records.

Figure 3 shows how often author-supplied keywords co-occur in the 25 eligible records. "Physical education" (n=5) and "traditional games" (n=3) are the two most prominent themes that the entire network revolves around, with other smaller clusters focusing on physical fitness, project-based learning, culturally responsive pedagogy, and meta-analytic methodology. This pattern indicates that the discipline mainly revolves around teaching approaches (PE, traditional games) rather than specific result-oriented terms, which is a pattern of fragmentation identified in the Introduction.

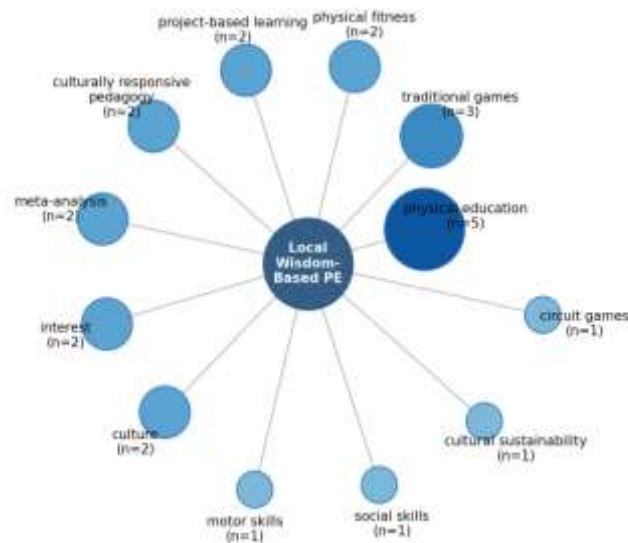


Figure 3. Keyword thematic cluster map of the 25 full-text-eligible records (author keywords).

Thematic Synthesis

Findings for RQ1: Physical Fitness

Three of the ten studies included in this analysis focused on physical fitness or motor skills as their main outcome through intervention of traditional games. Jariono et al. (2024) using a circuit training-based twelve-week traditional sports therapy program to work with Indonesian elementary students, the participants were rotated through five of game-based posts and the comparison of an experimental group with a no-intervention control group was done by means of validated fitness batteries (hanging bent-arm, the 600-meter run, vertical jump, 30-second sit-ups). The intervention group showed significant pre-post changes relative to controls, which means that games organized in circuits as traditional can be a structured, time-bounded fitness intervention, not just an enrichment activity.

Research-and-development studies provide converging evidence beyond simple intervention testing to formal model-building in sport-based physical education (PE). Using the ADDIE development framework, Maliki et al. (2025) constructed a learning model for PE based on traditional games and, besides, they got the model validated by certified PE experts in terms of its potential to improve students' physical fitness. On the other hand, Munir et al. (2024) showed that traditional sports games, when changed into an innovative endurance-building mode, led to the increased endurance of children compared with their levels at baseline. Both these pieces of research imply that, the ability of traditional games to enhance physical fitness is not limited to any one form of the game only (circuit play, endurance-oriented games) but, will the effect of the games in terms of the players' fitness level, be able to spread to different kinds of traditional-game interventions provided that the activities involve vigorous repeated engagement.

This pattern aligns quite well with, although it is a bit different from, results of the traditional-games research outside the present review's final inclusion set. Fauzi et al. (2023), when comparing Indonesian traditional bebetengan and boy-boyan games, revealed that elementary students developed better fundamental motor skills and got more involved while Hussain and Cheong (2022) concluded that the gross motor skills of Pakistani children improved to the greatest extent when they played traditional cultural games under high-contextual-interference schedules rather than through blocked, repetitive practice. Considering the present review's included studies, this agreement points to a possible explanation: traditional games might be beneficial to physical fitness and motor skills development not mainly because they carry cultural elements but rather, their game structures typically require players to perform variable, high-interference movements, so, in fact, this understanding challenges any assertion of the motor-learning mechanism being culturally specific even though it recognizes the use of cultural framing in increasing practical and motivational aspects of engagement and adherence.

Findings for RQ2: Social Interaction

Social interaction was a positive outcome domain across studies, although the measures used varied greatly between studies. Nurhayati et al. (2025) investigated how traditional Malay Riau games could be used in project-based learning of Indonesian primary students. They specifically designed the intervention based on the cultural value of gotong royong (mutual cooperation). The main point of this paper is that the traditional game content was linked to a social-relational construct, with the authors obtaining measurable improvements in students'

social cohesion skills; hence sociality was considered not as a side effect of the group activity but as an outcome of the cultural game content.

Supplementary qualitative data has linked these improvements to larger developmental changes. Andriati et al. (2025), employing participatory ethnographic methods combined with traditional Kalimantan games in early childhood education, revealed that cultural responsiveness, through play-based teaching, not only promoted holistic development (through social, cognitive, and motor aspects) but also, at the same time, facilitated cultural heritage preservation, thereby, point to social benefits that are deeply connected to, and not just a separate element of, the games' cultural authenticity incarnate.

Saearani et al. (2024), exploring preschool teachers' willingness to use traditional games as a basis for creative movements in Malaysia, indicated that teachers showed positive attitudes when using such content which can help in children's imagination development, a result that highlights the potential of peer collaboration and symbolic social play even though imagination was the focus (mainly) of the study's measured construct.

These findings cohere with, but also extend, evidence from outside the ten included studies. Repuya et al. (2021) found that integrating traditional games into mathematics instruction improved Filipino students' social skills and attitudes alongside conceptual understanding, indicating that the social-cohesion mechanism activated by traditional games is not confined to PE-labeled instructional time. At the same time, Yilmaz and Griffiths (2023) caution that traditional games' social problem-solving affordances depend on genuinely peer-negotiated, low-structure play; highly teacher-directed implementations of "traditional" content risk forfeiting precisely the social-cognitive benefits attributed to the games' informal cultural form. This tension was not directly tested within the present review's included studies, representing a methodological blind spot addressed further in Section 5.5.

Findings for RQ3: Enjoyment, Motivation, and Cultural Awareness

Winara et al. (2026) is the research that most directly implements the review's third result area, i.e. making and assessing an instructional model that intentionally combined science, technology, and local cultural wisdom in the PE lessons. The study that used a research and development design combined with quasi-experimental evaluation, revealed significant improvements in students' motivation, interest, and cultural awareness compared with their initial levels. It offers the strongest evidence from a single study within the examined literature that local wisdom incorporation and technological advancement are not two separate teaching methods but can be co-created to enhance one another's motivational effects.

Evidence from qualitative and meta-analytic research further supported cultural awareness as an outcome. By means of narrative inquiry with Ilocano community members in the Philippines, Concordia (2026) showed how traditional recreational games are a means of expressing cultural values and identity that participants directly linked to heritage pride and intergenerational connection, thus illustrating cultural awareness as a through experience, identity-affirming outcome rather than a purely cognitive one. Arsih et al. (2026) at a higher level of evidence synthesis performed a meta-analysis of the effects of traditional games on learning in general. They found a positive overall effect and explicitly acknowledged that one of the reasons for this benefit is the games' ability to keep the interest of the learners despite the competing, globalization-driven leisure alternatives.

Additional motivational support from outside local-wisdom framing not only backs up these results but also points out a limitation of the situation. Luo et al. (2020) discovered that team-game tournaments, a cooperative format structurally similar but culturally generic, significantly enhanced Taiwanese college students' learning motivation along with their physical skills, thus demonstrating that organized, socially interdependent play can improve motivation even in the absence of explicit cultural-heritage content. When considered together with meta-analytic evidence showing that game-based PE programming effectively enhances children's and adolescents' enjoyment compared to traditional teaching (Mo et al., 2024) and editorial syntheses highlighting the role of traditional games in emotional well-being and intelligent decision-making (Lavega-Burgués et al., 2023), the study finds that adding local wisdom content increases, rather than being the sole cause of, the motivational effects which are already present in game-based PE pedagogy, a viewpoint directly affecting how curriculum designers might balance cultural authenticity and quality of game-design especially when resources for both are limited.

Comparative and Critical Analysis

Methodologically, the ten papers in our review are a mixed bag but make thematic sense in terms of the combination of types of research designs. Quasi-experimental and pre-test/post-test intervention designs are the main types of designs used (Jariono et al., 2024; Luo et al., 2020; Munir et al., 2024; Nurhayati et al., 2025; Winara et al., 2026) the mindset in the field seems to be geared to finding evidence of measurable, attributable effects of particular game-based interventions. Another group consists of research-and-development (R&D) designs that emphasize the instructional model-building and expert content validation aspects far more than the

outcome measurement in a comparison group (Maliki et al., 2025) such studies reveal a curriculum-design orientation, as opposed to a purely evaluative one. A third, less numerous group consists of qualitative and meta-synthetic designs: participatory ethnography (Andriati et al., 2025), narrative inquiry (Concordia, 2026), survey-based attitude assessment (Saearani et al., 2024), and meta-analysis (Arsih et al., 2026). Taken together, they offer interpretive depth and cross-study aggregation that the mostly small-sample quasi-experimental studies are not capable of rendering individually.

Temporally, the evidence base is recent and rapidly developing, with nine out of ten studies published between 2024 and 2026, and only Luo et al.'s (2020) study being an exception. These findings show that a rigorous synthesis-level engagement with local wisdom-based PE pedagogy is becoming methodologically viable only now due to the still-limited primary literature. This clustering of time also suggests that methodological practices are continuing to mature; for example, sample sizes in the quasi-experimental studies are still small (usually less than 100 participants), control-group designs are used but not in every case, and only Arsih et al. (2026) carries out a formal meta-analytic pooling, pointing out that the volume of evidence in the field is not yet sufficient for the robust meta-analytic synthesis of effect sizes for the fitness, social-interaction, and enjoyment domains covered by RQ1 through RQ3. Methodologically, longitudinal or multi-wave studies that follow the sustainability of fitness and social cohesion improvements after a single intervention period, which are hardly used but are promising, have not been found among the ten included studies.

Discussion

Interpretation of findings. Overall, the thematic synthesis signifies that local wisdom-based innovative physical education models generally lead to similar positive outcomes, even though the strength and directness of the evidence vary among different areas. Physical fitness effects are the most straightforwardly measured through fitness testing batteries that have been validated within quasi-experimental designs. Social interaction effects, however, are more often detected through social cohesion constructs that are specifically culture-framed, whereas effects of enjoyment, motivation, and cultural awareness are derived from a combination of quasi-experimental, qualitative, and meta-analytic data. This trend indicates that local wisdom-based physical education pedagogy may function through at least two separate mechanisms: a structural mechanism which is game-based, socially interdependent, and contextually variable movement tasks that drive fitness and motor gains largely regardless of the cultural content; and a cultural-relevance mechanism which is the locally, heritage-rooted nature of the games that leads to motivational, identity, and social-cohesion benefits that are not easily produced by culturally generic game structures alone.

Theoretical implications. Essentially, these results enhance self-determination and socio-cultural theories about motor learning by elevating cultural relevance from being a mere contextual element to the actual driver of student engagement. In contrast to past PE motivation studies, which generally presented autonomy, competence, and relatedness as universal psychological needs, the included studies especially Winara et al. (2026) and Concordia (2026) show that relatedness, to a considerable extent, stems from cultural and intergenerational identifications rather than being solely based on peer or teacher relationships within the immediate instructional setting. Such a development seems to indicate that motivational models in multicultural or heritage-related PE settings might have to include a cultural-relatedness factor that is different from the interpersonal relatedness one, as it is normally understood and measured.

Practical implications. In fact, the review provides physical educators and curriculum developers various practical takeaways that they can act upon. To begin with, traditional games can be integrated into the standard fitness-testing schedules (for instance, circuit formats similar to Jariono et al., 2024), thereby not necessitating an entire reworking of the curriculum and making it easier for schools that have limited instructional time to implement changes. Besides, if the main outcome to be achieved is social cohesion or imagination/creativity, then the project-based or creative-movement paradigms (Nurhayati et al., 2025; Saearani et al., 2024) will be more fitting than the fitness-test-oriented circuit formats. Further, those involved in policymaking and teacher-education programs who aim at motivating students to engage in PE over a long period, especially in environments where children's leisure is rapidly going through digitalization, may consider the incorporation of local wisdom a rather economical add-on to technology-mediated PE innovation, instead of a replacement, which is in line with the co-design reasoning exhibited by Winara et al. (2026).

Comparison with prior reviews. It is difficult to directly compare the current results with previous systematic reviews because there is no previous SLR that covers exactly the same topic. However, it is possible to partially compare the results with those syntheses which are adjacent to this study thematically. For example, a meta-analysis conducted by Mo et al. (2024) on game-based physical education programming and enjoyment, which focus on cultural heritage, found that the pooled positive effect is in the same direction as the enjoyment-related findings reported in RQ3 of this paper which means that the present local wisdom findings are not the result of a particularly favorable evidence base but are consistent with the game-based physical education literature.

Likewise, the current findings regarding social interaction are in the same direction as those of Yılmaz and Griffiths' (2023) review of traditional games and social problem-solving skills in children, although the authors of that review emphasizing peer-negotiated, low-structure play, which raises a question of authenticity about how "traditional" the more teacher-directed interventions in the present review's included studies actually were and this question is addressed below.

Contradictions in the literature. There are some disagreements about where the motivational benefits mainly come from. Luo et al. (2020) find that even culturally neutral team-game tournaments can significantly boost motivation, which might be taken as evidence that cultural-heritage content is not necessary for motivational gains in PE. However, Winara et al. (2026) find motivational and cultural-awareness benefits specifically from the local wisdom element of their intervention, over and above what a generic game-based format would predict. It is not a direct empirical contradiction, the two studies looked at different populations, outcomes, and intervention designs, but it does mean a present synthesis cannot yet isolate the unique motivational contribution of cultural content net of general game-based instructional quality, a question that would require a head-to-head comparative design not present among the ten included studies

Research gaps. This paper has highlighted at least three areas where further studies would be necessary. Firstly, none of the selected papers used comparative research methods to isolate the effect of the local wisdom's cultural-heritage factor in a local wisdom intervention from the general game-based instructional features of the cultural-relevance mechanism as this part has been left largely untested. Secondly, there is a considerable lack of validated, cross-culturally comparable instruments that are capable of assessing enjoyment, social cohesion, and cultural awareness as PE-specific outcomes since most of the studies mostly used their own or adapted measures, which limit comparability and meta-analytic pooling. Lastly, the geographic and cultural representation still remains narrow as seven out of the ten included papers were from Indonesia, while those from Taiwan, Malaysia, and the Philippines were singular studies, which means that local wisdom-based PE pedagogy in Africa, the Americas, and much of South Asia is almost completely unsynthesized despite the fact that these regions have equally rich traditional-game heritages.

Limitations of this review. This review has some limitations which should be taken into consideration before interpreting its results. Firstly, the search was limited to only one database (Scopus) and a restricted export of records. Thus, it is possible that relevant studies indexed in other databases (such as ERIC, SPORTDiscus, or regional repositories) were not included. This is especially true for non-English language documents on traditional games, which were not eligible for this review based on the language criterion. Secondly, the very low number of articles finally selected for analysis (n=10) seriously limits both statistical and thematic generalization of the findings and also prevents formal meta-analytical combination of effect sizes in this review itself; hence, the present synthesis must be considered qualitative and interpretative rather than quantitative. Thirdly, the quality appraisal was performed using the FICO framework instead of a more well-established tool like the Mixed Methods Appraisal Tool or Cochrane risk-of-bias instruments. This may limit the ease of comparison with other health-sciences reviews where such tools are commonly used.

Future research agenda. To guide future research, scholars should focus on at least three aspects. For starters, comparative intervention programs at multiple sites which change the element of explicit cultural-heritage framing in game-based PE curricula would enable a direct assessment of the unique contribution of the cultural-relevance mechanism. Secondly, designing and adapting culturally-valid instruments specifically tailored to PE such as measuring enjoyment, social cohesion, and cultural awareness potentially expanding from already validated enjoyment scales in the game-based PE literature (Mo et al., 2024) will greatly enhance the comparability among future primary studies and allow for meta-analytic synthesis. Thirdly, intentionally replicating local wisdom-based PE models in less represented regions such as Sub-Saharan Africa, South Asia and Latin America, with similar protocols to those developed in Indonesia (e.g., Winara et al., 2026; Maliki et al., 2025), will be a means to test whether the structural and cultural-relevance mechanisms that are the focus of this review can be generalized beyond the contexts of Southeast Asia where they were mainly identified.

Summary answers to the research questions. In line with the review's main questions, RQ1 is positively answered local traditional game-based wisdom, especially when organized in circuits or endurance-building formats, result in the improvement of physical fitness, most likely through the high-interference, vigorous movement demands naturally characteristic of game structures rather than mere cultural content. RQ2 is also positively answered local wisdom-based PE methods significantly contribute to strengthening social interaction and cohesion, with the most prominent effects documented when cultural concepts like *gotong royong* are explicitly used and aimed at. RQ3 is given a partly positive answer local wisdom-based PE effectively increases enjoyment, motivation, and cultural awareness, however, the differential effect of cultural content over general game-based instructional quality still remains largely unresolved in the current studies.

Conclusions

The Authors of this systematic literature review gathered ten pieces of literature providing evidence for the research topic from an initial pool of forty records indexed by Scopus which were screened using PRISMA 2020 method. The purpose was to find out how innovative learning models based on local wisdom are implemented in physical education and what effects do they have on physical fitness, social interaction, and enjoyment. The results show that interventions based on traditional games have the most effect on students' physical fitness as they engage them with repeated, intense, and variably structured movements; that cooperative play with support from the cultural domain explicitly leads to a strong bonding and interaction among the players which is way more than what generic group activities can achieve; and that combining local cultural wisdom with present-day teaching techniques can boost motivation, enjoyment, and cultural awareness while maintaining a balance between heritage preservation and pedagogical innovation. The review's main contribution is that it brings together these three outcome strands within one methodologically clear, PRISMA 2020-compliant synthesis; however, because this evidence base rests on only ten studies drawn from a single database and concentrated largely in Southeast Asia, it should be read by physical educators, curriculum developers, and decision-makers as an initial, exploratory evidence base for considering the inclusion of local wisdom in physical education, with broader policy application warranting confirmation through multi-region replication. On a practical note, the findings call for the use of traditional exercises in the form of circuit training (e.g., 12-week, multi-session programs modeled on Jariono et al., 2024) or game-based activities to be integrated into the standard fitness programs, and the use of culturally specific forms of cooperative play where social cohesion is the desired outcome. One limitation of this review could be its dependence on a single database, a small final synthesis pool which is predominantly in Southeast Asia, the predominance of small-sample quasi-experimental and developmental studies that together limit the generalizability and exclude quantitative meta-analysis. RQ1 and RQ2 are answered with reasonable confidence by the present synthesis, whereas RQ3 remains only partly resolved, as detailed in the Summary answers to the research questions above. Consequently, future studies with comparative designs, validated cross-cultural instruments, and wider geographic replication — extending beyond the ten-study, single-database, largely Southeast Asian evidence base synthesized here — are necessary to verify and broaden these findings outside the contexts in which they were generated.

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