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Digital Technology and Traditional Games in Lower Secondary Physical Education

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Abstract

Objectives: To examine how digital technology can support traditional games in physical education for Indonesian Phase D learners and to develop an evidence-informed framework for classroom application.

Materials and Methods: A narrative literature review with qualitative thematic synthesis was undertaken. Targeted verification of literature on digital physical education, video feedback, traditional games, and implementation barriers supported the revision. Nine substantive publications and two methodological references were used. Evidence was compared by educational setting, study design, reported outcomes, and relevance to lower secondary education. No primary student data were collected or pooled effect estimates calculated.

Results: The synthesis identified four themes: digital support for demonstrations and feedback; movement and social learning opportunities through traditional games; a proposed sequence connecting demonstration, practice, observation, and reflection; and implementation constraints. The evidence supported the educational relevance of the separate components, but did not establish the effectiveness of their integration specifically in Phase D. Differences in learner age, instructional design, and methodological quality limited transfer across settings.

Conclusions: Digital technology may support traditional games when it serves a specific learning purpose and preserves opportunities for active movement. The proposed framework provides a basis for classroom testing rather than a validated instructional model. Future research should examine motor learning, participation, movement time, feasibility, and cultural relevance in lower secondary schools.

Keywords: physical education; traditional games; digital technology; video feedback; lower secondary education

Introduction

Physical education should give students opportunities to move, understand movement, make decisions, and participate responsibly with others. For the present review, Phase D refers to the Indonesian lower secondary context, encompassing Grades VII–IX in Indonesian SMP/MTs schools. The practical question is how teachers can introduce digital resources while sustaining the movement experiences and social interactions that give physical education its educational value.

Traditional games offer a culturally meaningful setting for this work. Their rules and movement demands can be adapted to instructional purposes, and their group structure creates situations in which learners negotiate space, coordinate actions, and respond to others. Wicahyani et al. (2025) reviewed their relevance across cognitive, affective, and psychomotor learning. However, the label traditional games covers diverse activities; a game that emphasizes running and evasion creates different learning opportunities from one organized around throwing accuracy. Educational claims therefore need to specify the game, its rules, and the teaching approach.

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Digital technology offers another set of instructional possibilities. Jastrow et al. (2022) identified opportunities for learning across several domains alongside limitations in teacher preparation. Mödinger et al. (2022) examined video-based feedback specifically, identifying its potential for motor learning under appropriate school conditions. These findings suggest that a short demonstration or a selected replay may help learners recognize an action that is difficult to explain verbally. They do not imply that increasing device use necessarily improves a lesson.

Evidence from traditional-games research is also relevant but varies in its proximity to Phase D. Aliriad et al. (2024) investigated motor skills and motivation in primary schools, whereas Putra et al. (2024) examined a traditional-games-based Teaching Games for Understanding approach with Grade VIII students. Neither publication directly evaluates the technology-supported integration considered here. Treating these studies as complementary evidence is useful, provided that differences in age group and intervention content remain explicit.

The gap addressed in this review is thus one of instructional integration and transfer. The selected literature discusses technology and traditional games more directly than it tests their combined use in Indonesian lower secondary lessons. This review examines their potential complementary functions, identifies conditions that may constrain classroom application, and proposes an instructional sequence for empirical testing. Its contribution is a bounded conceptual framework connecting existing evidence to a clearly specified teaching problem.

Materials and Methods

Study Design

This article uses a narrative literature review with qualitative thematic synthesis. A purposive approach was chosen to connect two related bodies of literature and develop a conceptual teaching framework. The review does not claim exhaustive coverage, a reproducible systematic screening process, or PRISMA compliance. The choice of a narrative approach follows the principle that the review method should match its purpose and available evidence (Snyder, 2019). Transparency about scope, referencing, and the level of evidence is also consistent with the reporting concerns discussed by Baethge et al. (2019); no numerical SANRA assessment was undertaken.

Study Participants

No students, teachers, or schools were recruited. Publications were the units of analysis. Phase D learners constitute the intended application context rather than an observed sample. References to participants in the Results section describe the samples of cited studies and must not be interpreted as participants in this review.

Study Organization

During preparation of this review, targeted web searches and publisher or institutional records were used to locate and verify sources corresponding to the review's principal themes. Searches combined terms including physical education, digital technology, video feedback, traditional games, motor skills, and implementation barriers, together with Indonesian terms such as permainan tradisional and keaktifan siswa SMP. Publication titles and DOI records were checked against the located source pages. This was a purposive source-identification and verification process rather than an exhaustive database search.

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Nine substantive publications were selected for direct relevance to digital physical education, video feedback, traditional-games learning, or teachers' implementation barriers. The selection comprised four research reviews and five empirical publications. Two additional methodological publications supported the review design and reporting. The substantive references were published between 2018 and 2025; the earlier gymnastics study was retained because its school-based adolescent sample was particularly relevant to the intended setting. Literature without an identifiable source was not used to support numerical or causal claims.

The synthesis compared each substantive publication's focus, educational context, design, reported findings, and transfer limitations. Four organizing themes were used: functions of digital support; learning opportunities through traditional games; connections between these components; and implementation conditions. These categories organize the narrative and were not generated through independently coded qualitative data. Table 1 summarizes the evidence base, while Table 2 presents the resulting conceptual proposal. No new risk-of-bias scores, independent reviewer agreement, or screening totals are reported.

Statistical Analysis

No inferential statistics or meta-analysis were conducted. Differences in intervention content, age group, design, and outcome measurement made a pooled estimate inappropriate for this narrative synthesis. Study-specific numbers are attributed to their original publications. The interpretation distinguishes findings reported in those studies from the present review's proposed classroom applications.

Results

Characteristics of the Evidence Base

The substantive literature covered technology use and feedback in physical education, traditional-games instruction, and teacher-reported implementation barriers. It included both primary and lower secondary settings. No selected publication directly tested the complete proposed integration in Indonesian Phase D classes. The evidence therefore informs the functions of individual components and the conditions for implementation rather than establishing an effect of the combined framework.

Table 1. Substantive literature informing the synthesis

Publication	Design and context	Relevant evidence	Transfer limitation
Aliriad et al. (2024)	Experimental study; 60 Indonesian primary pupils	Traditional-games instruction addressed motor skills and motivation.	Younger learners; no digital integration.
Hussain and Cheong (2022)	Practice-schedule experiment; 103 children aged 7–10	Traditional-game skills examined through acquisition, retention, and transfer tests.	Practice order and age limit direct transfer.
Jastrow et al. (2022)	Systematic review; digital physical education	Benefits and constraints across learning domains.	Heterogeneous technologies and teaching settings.
Knoke et al. (2024)	Systematic review; 17 empirical studies	Health-related digital approaches showed mixed evidence.	Methodological weakness in much of the evidence.
Mödinger et al. (2022)	Systematic review; 11 studies	Video feedback showed potential for motor learning.	School conditions affect implementation.

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Potdevin et al. (2018)	Comparative school study; novice adolescent gymnasts	Intermittent video feedback examined with self-assessment and teacher cues.	Gymnastics task rather than traditional games.
Putra et al. (2024)	One-group pretest–posttest; Grade VIII	Traditional-games-based TGfU associated with improved questionnaire scores.	No comparison group; no technology component.
Saiz-González et al. (2025)	Survey; 265 physical education teachers	Interest in technology coexisted with access, training, time, support, and privacy barriers.	Self-report in a different educational context.
Wicahyani et al. (2025)	Systematic review; traditional games	Cognitive, affective, and psychomotor opportunities were reported.	Broad scope; not a test of the proposed integration.

Table 1 shows that the literature addresses related but nonidentical questions. Evidence about feedback concerns how learners receive information; evidence about traditional games concerns the activity and instructional context; and teacher surveys concern feasibility. These sources cannot be treated as interchangeable estimates of a single intervention effect.

Digital Support for Demonstration and Feedback

Knoke et al. (2024) included 17 empirical studies from an initial pool of 1,492 records. The review described applications involving fitness technologies, online learning, digital games, video feedback, and flipped learning, while noting mixed results and methodological limitations. These are counts from that published review, not screening results from the present article. The findings support examining the purpose of a technology rather than assuming that all digital resources have similar effects.

Mödinger et al. (2022) synthesized 11 studies of video-based visual feedback. Their review suggested potential advantages for motor learning but emphasized constraints associated with class size, time, equipment, teacher competence, and data protection. Within the present framework, demonstrations and selected replays represent possible tools for making movement visible. Their use during traditional games remains an application proposed from related evidence.

Traditional Games as Learning Activities

Aliriad et al. (2024) studied 60 primary-school students across eight sessions in one month and reported benefits related to motor skills and motivation. Putra et al. (2024) reported a pre–post difference in Grade VIII students' activity-questionnaire scores after a traditional-games-based TGfU intervention ($p = .004$). The latter outcome reflects the instrument used; it is not a direct measurement of moderate-to-vigorous physical activity or proof of sustained engagement.

Hussain and Cheong (2022) compared practice schedules for traditional cultural game skills among 103 primary-school children. Random practice favored acquisition and retention, while random and game-based practice performed better than the other schedules on transfer. The study highlights the relevance of practice organization. Wicahyani et al. (2025) provided broader review evidence connecting traditional games with movement, strategy, motivation, and cooperation. Together, these publications identify possible learning targets without demonstrating that every traditional game develops all outcomes.

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A Proposed Sequence for Phase D Lessons

The conceptual synthesis assigns technology a supporting role at specific points in an otherwise active lesson. A demonstration introduces an observable learning target; play supplies practice and decisions; selected observation directs attention; and reflection prepares another attempt. Table 2 specifies the proposed sequence. It is a design proposition derived from adjacent evidence and has not been implemented or validated in this review.

Table 2. Proposed instructional sequence for classroom testing

Stage	Suggested teacher and student activity	Evidence to collect in a future trial
Introduce	Show a brief offline clip or illustrate rules; identify one movement or tactical target.	Rule understanding; explanation time.
Active practice	Play an adapted local game in small groups; rotate roles and opportunities.	Participation distribution; active movement time; safety incidents.
Focused observation	Review one selected action using teacher observation or an authorized short replay.	Feedback accuracy; device waiting time; learner interpretation.
Reflection and replay	Identify one adjustment, repeat the game, and discuss its effect.	Motor retention; tactical decisions; student reflections.

The sequence separates its instructional purpose from its delivery medium. Where recording is unsuitable or unavailable, direct observation can support the same reflection task. The appropriate comparison in future research is whether the digital element adds value to a well-taught traditional-games lesson.

Implementation Conditions

Saiz-González et al. (2025) surveyed 265 physical education teachers. Their reported barriers included equipment access, training, institutional support, time, and student data privacy. These findings identify implementation issues to examine locally; they do not establish their frequency in Indonesian schools. Alongside the constraints identified in the technology reviews, they indicate that feasibility needs to be evaluated together with learning outcomes.

Discussion

Connecting Feedback with Meaningful Practice

The main interpretation is that traditional games and digital resources can serve complementary instructional functions. Games provide the activity in which a learner must act; demonstrations and feedback may clarify what to attend to before acting again. The educational mechanism proposed here is a connection between information and subsequent practice. A lesson that ends with watching a replay without another opportunity to play would leave that connection incomplete.

Potdevin et al. (2018) offer a useful comparison because their participants were novice adolescent learners in school gymnastics. Video feedback was combined with self-assessment and teacher instructions, and the study reported learning-related advantages within that program. This supports examining a structured feedback routine rather than simply making recordings available. However, a discrete gymnastics action differs from the changing interpersonal conditions of a traditional game. For Phase D implementation, a replay should therefore address a manageable feature, such as the timing of a pass or the use of open space, rather than invite correction of every movement at once.

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This interpretation also fits the implementation cautions of Mödinger et al. (2022). A teacher must decide whose performance is reviewed, what information is useful, and how quickly students can return to practice. The framework consequently proposes selective observation rather than continuous recording. Whether that choice improves learning while protecting movement time is a research question, not an outcome established here.

Interpreting Evidence from Traditional Games

The traditional-games studies support purposeful game selection. Aliriad et al. (2024) provide evidence from primary education, while Putra et al. (2024) are closer to the intended Grade VIII setting. Their differences matter: a pre–post change in self-reported activity cannot establish the same conclusion as an objectively assessed motor-learning outcome. In particular, the absence of a comparison group in Putra et al. prevents isolation of the instructional model from other influences on change.

Hussain and Cheong (2022) further show why the organization of practice deserves attention alongside the cultural identity of the activity. Their findings encourage testing how learners encounter varied movement problems and whether learning transfers beyond a practiced task. For the proposed integration, teachers could vary space, group size, or decision demands while preserving the recognizable rules and meaning of the chosen game. Such adaptations should be documented so that a future evaluation can identify what students actually experienced.

The broader domains discussed by Wicahyani et al. (2025) suggest that cooperation and understanding can be considered alongside motor performance. These outcomes should nevertheless be measured separately. An enjoyable lesson does not automatically demonstrate cooperation, and improved skill execution does not establish cultural understanding. Locally meaningful evaluation could ask students to explain a game's rules and background while using observation to examine participation and interaction.

Feasibility and Implications for Teachers

The barrier pattern reported by Saiz-González et al. (2025) argues for evaluating implementation demands before scaling an intervention. In a school with limited devices, one teacher-managed offline clip may be more feasible than requiring each learner to use an application. This is a practical proposal, not a comparative finding. Teacher preparation should address choosing a learning target, organizing groups, giving concise feedback, and maintaining access to the activity for students with different movement abilities.

Jastrow et al. (2022) also drew attention to the limited treatment of media-related educational concerns within digital physical education research. Consequently, recording should be accompanied by clear educational purposes, appropriate permissions, restricted access, and an agreed deletion procedure. Students who are not recorded should retain equivalent learning opportunities. Safety planning should address the playing surface, equipment, movement intensity, and local variations in rules. These recommendations describe implementation responsibilities rather than legal conclusions.

Knoke et al. (2024) found that the direction of the relationship between digital media and physical activity was not clear across the reviewed evidence. The present framework therefore treats active movement time as an outcome requiring measurement. Reporting only satisfaction or motivation would leave unanswered whether screens, device queues, or extended explanations displaced practice. A feasible lesson must make time for meaningful participation as well as for feedback.

Limitations and Future Research

This review uses a purposive, nonexhaustive evidence base and is vulnerable to selection and interpretation bias. It does not provide a reproducible database search or an independent study-quality assessment. Published reviews may contain overlapping primary studies, so their findings must not be counted as independent replications. The synthesis also combines different educational levels, activities, and outcome measures. These constraints limit conclusions about effectiveness and prevent a claim that relevant integration research is absent from the wider literature.

The proposed sequence should next be examined in a documented feasibility study in Phase D classes. Teachers and students can first assess the cultural suitability of the game, clarity of the media, accessibility, and time demands. A subsequent controlled study could compare technology-supported traditional games with the same games taught without digital support, using comparable content and lesson time. Baseline and postintervention assessment should be supplemented by retention testing where feasible. Motor performance, rule understanding, participation, active movement time, and implementation fidelity would help distinguish learning effects from initial enthusiasm. The review's contribution is to specify these testable connections and boundaries, rather than claim a completed development-and-validation process.

Conclusions

Digital technology offers a plausible means of supporting demonstrations, observation, and reflection during traditional-games-based physical education. Existing studies provide related evidence for the individual components, but the selected literature does not establish the effectiveness of their integration for Indonesian Phase D learners. The proposed sequence links concise information with active practice and opportunities to apply feedback. Teachers can use it as a planning proposition adapted to local resources and cultural contexts. Empirical testing should determine whether digital support adds educational value while sustaining movement opportunities, inclusion, and feasible classroom routines.

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