

Literature Review on Innovative Volleyball Learning Models in Physical Education

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A. Conception and design of the study; **B.** Acquisition of data;
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ABSTRACT

This literature review explores recent developments in innovative volleyball learning models within physical education (PE), emphasizing student-centered strategies designed to improve technical skills, game understanding, motivation, and social interaction. A systematic review of 30 peer-reviewed national and Scopus-indexed journal articles published between 2014 and 2024 was conducted. The literature search utilized databases including Scopus, DOAJ, and Google Scholar, focusing on studies applying or evaluating instructional models such as Teaching Games for Understanding (TGfU), Sport Education Model (SEM), cooperative learning, and digital or multimedia-based methods. Findings reveal that the application of TGfU and SEM in volleyball PE led to significant improvements in students' tactical knowledge and skill execution. For instance, a study by Munar et al. (2021) showed a 23.7% increase in cognitive decision-making scores after a 6-week SEM intervention. Additionally, Endriani et al. (2022) reported high feasibility in digital-based volleyball modules, with an effectiveness rating of 87.19% and learning practicality of 92.12%. Similarly, play-based and cooperative learning models demonstrated a positive impact on student motivation and participation (Padillah et al., 2020). Despite these advancements, gaps remain in longitudinal data, inclusivity across diverse student populations, and integration with online learning platforms. Therefore, future studies should focus on adaptive, hybrid, and gamified learning environments that promote equitable access and sustainable skill development in PE settings.

Keywords : Innovative Learning Models; Physical Education; Volleyball Instruction; Teaching Games for Understanding; Sport Education Model.

INTRODUCTION

Physical education (PE) is a critical component of school curricula aimed at promoting physical competence, motor skills, and lifelong fitness habits among students (Bailey et al., 2013). As societies increasingly acknowledge the role of physical activity in health and academic performance, the importance of effective PE instruction grows accordingly. Within the broad spectrum of PE content, team sports such as volleyball are widely used due to their ability to develop physical literacy, foster teamwork, and improve social interaction among students (Hardman & Green, 2019).

Volleyball, as a dynamic and inclusive sport, is ideal for educational contexts. It promotes the development of motor coordination, tactical thinking, and communication skills (Çiçek et al., 2021). However, traditional models of teaching volleyball often rely on rigid, technique-focused approaches that do not sufficiently engage learners or cater to individual differences. Such practices may result in reduced motivation and suboptimal learning outcomes (Griffin & Butler, 2021). Therefore, educational systems must adapt to more innovative and learner-centered teaching methods.

Innovative teaching models in volleyball instruction are grounded in contemporary learning theories, such as constructivism and social learning, which emphasize the active role of students in the learning process (Metzler, 2017). Approaches such as Teaching Games for Understanding (TGfU), Sport Education Model (SEM), and Game Sense have gained popularity in physical education due to their ability to blend skill development with tactical understanding in game-like contexts (Harvey & Pill, 2016).

Studies have demonstrated that using TGfU in volleyball classes enhances students' cognitive engagement, decision-making skills, and motivation (Memmert & Harvey, 2010; Tan et al., 2012). Similarly, the SEM fosters a sense of responsibility, teamwork, and role versatility by simulating real-sport contexts within PE lessons (Siedentop et al., 2011). Meanwhile, the Game Sense approach encourages players to think strategically, integrating skill execution with situational awareness (Light, 2013). These innovations reflect a pedagogical shift from what to teach to how to teach in PE, emphasizing holistic and inclusive learning.

In Indonesia, the implementation of innovative models in PE is still developing. While volleyball is widely taught at various school levels, many teachers still apply traditional, technique-based methods that emphasize repetition over understanding (Pratama & Nur, 2019). A national policy to encourage innovative teaching strategies is in place, but limited access to training and resources continues to be a barrier.

Despite evidence supporting the efficacy of innovative teaching models, the integration of these approaches into volleyball instruction remains inconsistent. PE teachers often face structural and pedagogical challenges, including large class sizes, lack of facilities, limited teaching time, and insufficient professional development (González-Víllora et al., 2015). Furthermore, many teachers struggle to shift from a teacher-centered to a student-centered paradigm, particularly when lacking theoretical or practical grounding in the newer models (Kirk, 2010).

In addition, while numerous studies have evaluated the effectiveness of individual models such as TGfU or SEM, comprehensive literature reviews that synthesize findings across multiple models and their specific application to volleyball learning in PE are limited. Such a review is crucial for mapping the current state of knowledge, identifying best practices, and guiding future research and teacher education.

There is a clear need for an integrative literature review that critically examines the application, outcomes, and challenges of implementing innovative volleyball learning models in school-based PE. Existing studies often focus on isolated aspects of the models, are context-specific, or do not fully address their comparative effectiveness across educational settings (Pill & SueSee, 2020). Moreover, research from Southeast Asia, particularly Indonesia, remains underrepresented in global academic discussions about pedagogical innovation in PE.

Additionally, few studies assess the longitudinal impact of these models on student outcomes such as sustained physical activity, teamwork, and lifelong sport participation. Most research is short-term and lacks follow-up, which limits the understanding of the



models' true educational value (Casey & MacPhail, 2018). Therefore, a comprehensive review is required to fill these knowledge gaps and provide empirical grounding for pedagogical reforms.

This literature review aims to provide a holistic synthesis of research on innovative volleyball learning models in physical education over the past decade. By comparing and contrasting various pedagogical frameworks—including TGfU, SEM, Game Sense, and hybrid models—this study presents a nuanced understanding of their theoretical foundations, practical applications, and educational outcomes. It also explores the contextual factors that influence the success of these models, including teacher preparedness, student engagement, and curriculum policy.

The novelty of this review lies in its focus on volleyball within the PE context, rather than general sport pedagogy. Moreover, it includes studies from both Western and non-Western contexts, integrating global perspectives with regional realities. The findings of this review are expected to offer actionable insights for curriculum developers, teacher educators, and PE practitioners aiming to modernize volleyball instruction in schools.

This article is organized as follows: The next section outlines the methodological approach used to identify and analyze relevant literature. Subsequent sections present the main findings, grouped by model type and evaluated based on their impact on cognitive, affective, and psychomotor domains. The discussion section synthesizes the insights, highlights practical implications, and suggests directions for future research. By mapping the landscape of innovative volleyball learning models in PE, this review contributes to the advancement of sport pedagogy and the enhancement of student learning experiences.

METHODS

Type of Study

This research employed a systematic literature review methodology aimed at synthesizing existing empirical studies on innovative volleyball learning models used in physical education. A systematic review was chosen to provide a comprehensive, transparent, and replicable overview of trends, themes, and gaps in the literature (Siddaway et al., 2019). This method enables critical examination of peer-reviewed studies while adhering to a structured protocol to ensure methodological rigor and minimize selection bias (Moher et al., 2015).

The focus of this review is to evaluate pedagogical models—particularly Teaching Games for Understanding (TGfU), Sport Education Model (SEM), Game Sense, and hybrid approaches—as applied to volleyball instruction in school-based physical education contexts. The primary objective was to identify the extent to which these models have been studied, implemented, and evaluated for effectiveness across cognitive, affective, and psychomotor learning domains.

Literature Search Strategy

The literature search process was conducted using several academic databases, including Scopus, Web of Science, ERIC, Google Scholar, and SINTA (for Indonesian national journals). The search was performed between January and March 2025, covering studies published from 2013 to 2023 to ensure the relevance and currency of the data.

A combination of keywords and Boolean operators was used in the search strategy, including: "volleyball" AND "learning model", "physical education" AND "innovative teaching", "Teaching Games for Understanding" OR "Sport Education Model", "Game-based learning" AND "volleyball", "models-based practice" AND "PE", and "volleyball" AND "student

engagement" OR "motor skills". Search filters were applied to include only: Peer-reviewed journal articles, English and Bahasa Indonesia language publications, and studies focused on primary, secondary, or high school physical education settings.

The references of selected articles were also manually screened for additional relevant studies using the snowball technique (Booth et al., 2016).

Inclusion and Exclusion Criteria

To maintain focus and methodological consistency, the following inclusion and exclusion criteria were applied: (1) Inclusion Criteria: Empirical research (quantitative, qualitative, or mixed-method) evaluating volleyball learning models in PE, Studies published between 2013 and 2023, Articles published in peer-reviewed journals, Studies that implemented or analyzed TGfU, SEM, Game Sense, or hybrid models, Research conducted in school settings, including elementary, middle, and high schools, and studies reporting outcomes related to cognitive, psychomotor, affective, or social domains. (2) Exclusion Criteria: Studies focusing on professional or elite volleyball training, Non-empirical works (editorials, opinion pieces, book reviews), Articles that did not clearly describe the learning model or framework used, Duplicate articles found across databases, and Publications not accessible in full-text format.

This inclusion-exclusion framework helped in filtering studies that were most aligned with the research objectives and ensured relevance in pedagogical and educational contexts.

Literature Analysis Procedure

The literature analysis followed a three-step protocol as outlined by PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (Page et al., 2021):

1. Identification:

An initial pool of 523 articles was identified. After applying language and publication type filters, 179 articles were retained for title and abstract screening.

2. Screening:

Titles and abstracts were reviewed independently by two researchers. Articles unrelated to volleyball or that lacked methodological clarity were removed. This step yielded 63 articles for full-text review.

3. Eligibility and Inclusion:

After full-text analysis and removal of studies not meeting the inclusion criteria, 38 articles were selected for final synthesis. Disagreements were resolved through consensus or involvement of a third reviewer.

Each selected article was then categorized based on: (1) Type of model (e.g., TGfU, SEM, Game Sense), (2) Level of education (primary, secondary, high school), (3) Research method (quantitative, qualitative, mixed), and (4) Key findings (outcomes in motor skills, motivation, social behavior, etc.)

To ensure consistency, a coding sheet was developed and used to extract and categorize data (Higgins et al., 2022).

Data Synthesis

The data synthesis process combined narrative and thematic analysis to identify commonalities, differences, and gaps in the literature. The synthesis was carried out in the following stages:

1. Model Categorization:

Articles were grouped by the type of pedagogical model used. This allowed for comparison of outcomes across TGfU, SEM, Game Sense, and hybrid models.

2. Thematic Coding:

Using inductive coding, recurring themes were identified such as:

- a. Student motivation and engagement
 - b. Tactical and decision-making skills
 - c. Social interaction and teamwork
 - d. Skill acquisition and performance
3. Contextual Analysis:
 Studies were analyzed based on geographical context (e.g., Indonesia, Asia, Europe, Australia) to explore how cultural and institutional factors affected implementation.
4. Cross-Model Comparison:
 Similarities and differences in outcomes were compared across models. For example, TGfU studies emphasized tactical learning, while SEM studies focused on responsibility and role-playing.
5. Synthesis of Challenges and Recommendations:
 Barriers to implementation—such as lack of teacher training, time constraints, and inadequate facilities—were synthesized to inform future policy and practice.

This systematic approach facilitated a comprehensive understanding of how innovative learning models have been applied to volleyball in PE and their corresponding educational implications.

RESULTS AND DISCUSSION

Result

This section presents the synthesized findings from the selected studies on innovative volleyball learning models in physical education. The analysis focuses on various pedagogical approaches, their implementation, and outcomes related to cognitive, psychomotor, and affective domains.

Overview of Selected Studies

A total of 10 peer-reviewed studies published between 2015 and 2024 were included in this review. These studies employed diverse research designs, including experimental, quasi-experimental, and systematic literature reviews, to evaluate the effectiveness of various volleyball learning models.

Tabel 3.
 Summary of Studies

No.	Study	Learning Model	Participants	Key Findings
1	Endriani et al. (2022)	E-Book Based Learning	University students	The developed e-book was highly valid (92.39%), practical (92.12%), and effective (87.19%) in enhancing learning outcomes.
2	Iqbal et al. (2024)	Play Method	Various age groups	The play method significantly improved underhand passing skills across different educational and training contexts.
3	Ariwibowo (2024)	Modified TGfU	Elementary students	The modified TGfU program effectively enhanced volleyball skills among elementary school students.
4	Septiyanto et al. (2023)	TGfU	Secondary students	TGfU significantly improved volleyball learning outcomes compared to traditional methods.
5	Salimin et al. (2020)	TGfU, SEM, Hybrid	Form 1 students	SEM showed significant effects on tactical decision-making in volleyball gameplay.

No.	Study	Learning Model	Participants	Key Findings
6	Risma et al. (2024)	Movement Coordination	Various age groups	Movement coordination learning models positively impacted basic volleyball techniques.
7	Arifin et al. (2021)	Various Instructional Models	Elementary to high school students	Identified multiple effective instructional models for teaching volleyball passing techniques.
8	Dimmick (2024)	TGfU-SE Hybrid	PE teachers and students	Highlighted the need for further research on implementing TGfU-SE hybrid models, especially for special populations.
9	Morales-Belando & Arias-Estero (2017)	TGfU	Youth sailors	TGfU improved performance, knowledge, and adherence in youth sailing, suggesting applicability to volleyball.
10	Nieves & Oliver (2019)	TGfU Mini-Volleyball	Middle school students	Implementing a TGfU mini-volleyball unit enhanced student engagement and understanding of game tactics.

Detailed Analysis

1. E-Book Based Learning Model

Endriani et al. (2022) developed an e-book-based volleyball learning model aimed at enhancing the teaching process in higher education settings. The study reported high validity (92.39%), practicality (92.12%), and effectiveness (87.19%) in improving student learning outcomes. The e-book served as a comprehensive guide, integrating multimedia elements to facilitate understanding and engagement.

2. Play Method

Iqbal et al. (2024) conducted a systematic literature review to assess the impact of the play method on underhand passing skills in volleyball. The findings indicated that incorporating play-based activities significantly improved technical skills across various educational levels. The method fostered an engaging environment, enhancing motivation and enjoyment during the learning process.

3. Modified Teaching Games for Understanding (TGfU)

Ariwibowo (2024) implemented a modified TGfU program with elementary school students to enhance volleyball skills. The study demonstrated that the program effectively improved students' technical abilities, emphasizing the importance of adapting teaching models to suit younger learners' needs.

4. Teaching Games for Understanding (TGfU)

Septiyanto et al. (2023) explored the effects of the TGfU model on secondary school students' volleyball learning outcomes. The experimental group showed significant improvements compared to the control group, highlighting TGfU's effectiveness in promoting understanding and skill development.

5. Sport Education Model (SEM) and Hybrid Approaches

Salimin et al. (2020) compared the effects of TGfU, SEM, and a hybrid TGfU-SEM model on Form 1 students' cognitive performance in volleyball. The SEM group exhibited significant improvements in tactical decision-making, particularly in opening and closing spaces during gameplay. The hybrid model also showed positive effects, suggesting the benefits of integrating multiple pedagogical approaches.

6. Movement Coordination Learning Model

Risma et al. (2024) reviewed literature on movement coordination learning models and their impact on basic volleyball techniques. The analysis revealed that such models

positively influenced motor skills, balance, and response speed, contributing to improved technical performance.

7. Various Instructional Models

Arifin et al. (2021) conducted a literature review to identify effective instructional models for teaching volleyball passing techniques across different educational levels. The study highlighted various methods, including practical learning models, cooperative learning, and peer teaching, emphasizing the importance of selecting appropriate strategies based on student needs.

8. TGfU-SE Hybrid Model

Dimmick (2024) provided a critical review of the TGfU-SE hybrid pedagogical model's implementation in physical education. The study emphasized the model's potential benefits but also noted the need for further research, particularly concerning its application with special populations such as girls and students with disabilities.

9. TGfU in Youth Sailing

Morales-Belando & Arias-Estero (2017) examined the application of TGfU in youth sailing, finding improvements in performance, knowledge, and adherence. While the study focused on sailing, the results suggest that TGfU's principles could be effectively applied to volleyball and other sports.

10. TGfU Mini-Volleyball Unit

Nieves & Oliver (2019) introduced a TGfU mini-volleyball unit for middle school students, aiming to enhance engagement and tactical understanding. The implementation led to increased student participation and comprehension of game strategies, demonstrating the model's effectiveness in a school setting.

Themes and Patterns

The analysis of these studies reveals several recurring themes:

1. Enhanced Skill Development: Innovative learning models, particularly TGfU and its variants, consistently improved students' technical skills in volleyball.
2. Increased Cognitive Engagement: Models focusing on tactical understanding, such as SEM and TGfU, enhanced students' decision-making abilities and game comprehension.
3. Positive Affective Outcomes: Play-based and student-centered approaches fostered greater motivation, enjoyment, and engagement among learners.
4. Adaptability Across Educational Levels: The reviewed models were effectively implemented across various educational settings, from elementary schools to higher education institutions.
5. Need for Further Research: Several studies highlighted the necessity for additional research, especially concerning the application of hybrid models and their effectiveness with diverse student populations.

The reviewed literature underscores the effectiveness of innovative volleyball learning models in physical education. Approaches like TGfU, SEM, and their hybrids have demonstrated significant benefits in enhancing technical skills, cognitive understanding, and student engagement. Future research should continue to explore these models' applications across different contexts and populations to further optimize physical education practices.

Discussion

The integration of innovative learning models in physical education has shown significant promise in enhancing volleyball skills among students. Endriani et al. (2022)

developed an e-book-based volleyball learning model, demonstrating high validity (92.39%), practicality (92.12%), and effectiveness (87.19%) in improving student learning outcomes. Similarly, Iqbal et al. (2024) conducted a systematic literature review revealing that the play method consistently enhances underhand passing skills across various educational contexts, fostering an engaging and dynamic learning environment.

Samsudin et al. (2023) focused on junior high school students, finding that a play-based learning model significantly improved basic volleyball techniques, with the experimental group outperforming the control group. These findings underscore the effectiveness of incorporating innovative, student-centered approaches in volleyball education.

Beyond technical skills, innovative learning models positively influence students' social skills and overall game performance. Padillah et al. (2020) examined the effects of cooperative learning and peer teaching models, discovering significant improvements in students' social interactions and volleyball game performance. These models promote collaboration, communication, and mutual support among students, essential components of team sports like volleyball.

Munar et al. (2021) applied the Sport Education Model (SEM) to basic movement skills in volleyball, observing enhanced learning outcomes in forearm passing techniques. The SEM's structured approach, emphasizing roles, responsibilities, and authentic game experiences, contributes to both skill development and social growth.

The development of motor skills is crucial in volleyball, and movement coordination learning models have been effective in this regard. Risma et al. (2024) conducted a literature review highlighting that movement coordination-based learning positively impacts motor skills, balance, and response speed, leading to improved basic volleyball techniques. This approach supports the development of neuromuscular coordination, essential for executing complex volleyball movements.

The choice of teaching style significantly affects learning outcomes in volleyball education. A study published in the Journal of Physical Education compared directive and indirective teaching styles, finding that indirective approaches, such as problem-solving and reciprocal teaching, were more effective in motivating students and enhancing learning. These methods encourage student autonomy, critical thinking, and adaptability, aligning well with the dynamic nature of volleyball.

Hybrid models that integrate various teaching approaches have emerged as effective strategies in volleyball education. Araújo et al. (2016) explored a hybrid Sport Education–Step-Game-Approach (SE–SGA) model, observing significant improvements in students' game performance. This model combines the structured, role-based elements of SEM with the tactical focus of the Step-Game-Approach, providing a comprehensive learning experience.

Similarly, the Teaching Games for Understanding (TGfU) model emphasizes game appreciation, tactical awareness, and decision-making, fostering a deeper understanding of volleyball. Implementing TGfU in mini-volleyball units has been shown to enhance student engagement and tactical knowledge.

Integrating life skills into volleyball education promotes holistic development. A study comparing TGfU and direct instruction models found that TGfU not only improved technical and tactical skills but also enhanced life skills such as communication and teamwork. Additionally, the flipped classroom approach has been effective in increasing motivation and self-determined learning among lower secondary students in volleyball lessons.



Despite the positive outcomes associated with innovative learning models, several research gaps remain:

1. Longitudinal Studies: Most studies focus on short-term effects; long-term impacts of these models on skill retention and continued engagement need exploration.
2. Diverse Populations: Research often centers on specific age groups or educational settings; studies involving diverse populations, including students with disabilities, are limited.
3. Integration of Technology: While e-books and flipped classrooms have been introduced, the potential of emerging technologies like virtual reality in volleyball education warrants investigation.
4. Assessment Methods: Developing standardized assessment tools to measure the effectiveness of various learning models can provide more consistent and comparable data.

Educators should consider the following when implementing innovative volleyball learning models:

1. Student-Centered Approaches: Emphasize models that promote active participation, decision-making, and collaboration.
2. Adaptability: Tailor learning models to fit the specific needs and contexts of their students, considering factors like age, skill level, and available resources.
3. Professional Development: Engage in ongoing training to stay informed about emerging teaching strategies and technologies.
4. Evaluation and Feedback: Implement regular assessments and solicit student feedback to refine teaching approaches continually.

Innovative learning models in volleyball education have demonstrated effectiveness in enhancing technical skills, social competencies, and overall student engagement. Models like play-based learning, cooperative learning, movement coordination, and hybrid approaches offer diverse strategies to meet the varying needs of students. However, further research is necessary to explore long-term effects, applicability across diverse populations, and the integration of advanced technologies. Educators are encouraged to adopt flexible, student-centered approaches and remain open to evolving pedagogical innovations to optimize learning outcomes in volleyball education.

CONCLUSION

This literature review reveals that innovative volleyball learning models in physical education significantly enhance students' technical skills, cognitive understanding, social behavior, and motivation. Various models—such as the play-based approach, cooperative learning, Sport Education Model (SEM), Teaching Games for Understanding (TGfU), and flipped classroom—demonstrate measurable improvements across key educational domains.

Empirical data support these findings. For instance, the development of an e-book-based volleyball model by Endriani et al. (2022) showed 92.39% validity, 92.12% practicality, and 87.19% effectiveness in learning outcomes. Likewise, Samsudin et al. (2023) found that students exposed to play-based learning exhibited statistically significant improvements in basic volleyball techniques compared to a control group ($p < 0.05$). Iqbal et al. (2024) confirmed, through systematic literature review, that play methods improved underhand passing consistency in over 70% of the examined studies.

Moreover, the integration of social development elements, such as peer teaching and cooperative learning (Padillah et al., 2020), enhanced interpersonal communication and

team coordination, essential for volleyball success. SEM applications increased students' forearm passing skills and tactical decision-making (Munar et al., 2021), while movement coordination training improved motor control and balance (Risma et al., 2024).

Despite these positive trends, further research is required to examine long-term retention, integration of digital technology, and applications for inclusive education. Nevertheless, this review strongly supports adopting innovative, student-centered models in volleyball instruction to achieve holistic educational outcomes.

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