COMPETITOR:
JURNAL PENDIDIKAN KEPELATIHAN OLAHRAGA
e-ISSN: 2657-0734 & p-ISSN: 2085-5389 ‖ Volume 18, Number 2, 2026 ‖ P.2169-2179

Development of A Sepak Sila Learning Model In The Game of Sepak Takraw

Moh. Huzain[1A-E*], Sardiman[2B-D], Didik Purwanto[3B-D], Ryo Sinung Primadana[4B-D]

[1,2,3,4] Universitas Tadolako, Sulawesi Tengah, Indonesia

huzain.if05@gmail.com[1*], sardiman425@gmail.com[2], didikpurwanto1283@gmail.com[3], ryosinung@gmail.com[4]

ABSTRACT

This study aims to develop a learning model for sepak sila techniques in the sepak takraw game for students of the Physical Education, Health, and Recreation (PJKR) Study Program, Universitas Tadulako, class of 2023. The research was motivated by the limited variation in existing learning models, which has led to difficulties among students in mastering basic sepak takraw techniques and decreased motivation during the learning process. This study employed a Research and Development (R&D) method based on the Borg and Gall model, which includes stages of needs analysis, planning, initial product development, expert validation, small-group trials, product revision, and large-group trials. The research subjects consisted of two sepak takraw experts, one learning expert, and PJKR students of the 2023 cohort. Data were collected using questionnaires and analyzed using descriptive percentage techniques. The results of the study indicated that the needs analysis reached 94.3%, highlighting a strong demand for the development of a new learning model. Expert validation showed that Sepak Takraw Expert I gave a score of 94%, Expert II 81%, and the learning expert 90%, all categorized as feasible. Furthermore, the small-group trial resulted in a feasibility score of 70%, while the large-group trial improved to 75%. In conclusion, the developed sepak sila learning model is considered feasible and effective for use in sepak takraw learning. The model is expected to enhance student motivation, provide more varied learning experiences, and improve students' mastery of fundamental sepak sila techniques.

ARTICLE HISTORY
Received: 2026/03/11
Accepted: 2026/03/23
Published: 2026/05/10

KEYWORDS
Sepak Takraw;
Learning Model;
Sepak Sila Technique;
Physical Education;
R&D Method.

AUTHORS' CONTRIBUTION
A. Conception and design of the study;
B. Acquisition of data;
C. Analysis and interpretation of data;
D. Manuscript preparation;
E. Obtaining funding

Cites this Article : Huzain, M.; Sardiman, S.; Purwanto, D.; Primadana, R.S. (2026). Development of A Sepak Sila Learning Model In The Game of Sepak Takraw. **Competitor: Jurnal Pendidikan Kepelatihan Olahraga**. 18 (2), p.2169-2179

INTRODUCTION

Education is widely recognized as a fundamental human necessity that plays a critical role in shaping high-quality human resources and fostering national character development. In contemporary educational systems, particularly in Indonesia, education serves not only cognitive advancement but also the cultivation of moral values, nationalism, and social responsibility (Rahayu Widodo et al., 2018; Kurniawan & Hartati, 2017). Within this framework, physical education emerges as an essential component of

holistic education, integrating physical, psychological, social, and emotional development in a balanced and synergistic manner (Bailey et al., 2018; Kirk, 2019).

Physical education is not merely a medium for physical activity but a structured pedagogical process designed to enhance psychomotor skills, cognitive understanding, and affective domains such as teamwork, discipline, and sportsmanship (Casey & Goodyear, 2015; Dyson, 2019). In higher education contexts, particularly in Physical Education, Health, and Recreation (PJKR) programs, the challenge lies in designing learning models that are both pedagogically effective and contextually relevant to student needs and cultural identity.

One of the sports that embodies both educational and cultural value is sepak takraw. As a traditional sport deeply rooted in Southeast Asian culture, sepak takraw offers significant potential as a learning medium that integrates technical skill development with cultural preservation (Aziz et al., 2017; Ramadhan & Bulqini, 2018). The game requires complex motor coordination, agility, balance, and tactical understanding, making it highly relevant for physical education curricula (Hidayat et al., 2020; Atmaja et al., 2019).

However, despite its potential, the teaching and learning process of sepak takraw—particularly at the university level—faces several challenges. One critical issue is the limited mastery of fundamental techniques among students, especially the sepak sila, which is considered the foundational skill in sepak takraw (Jamalong & Syam, 2014; Tanzila et al., 2023). The sepak sila technique plays a central role in ball control, passing accuracy, and game continuity, yet many students struggle to perform it effectively due to inadequate instructional models and lack of engaging learning strategies.

Empirical observations and needs analysis conducted among PJKR students of the 2023 cohort reveal that 94.3% of students require variations in learning models for sepak sila techniques, indicating a strong demand for innovation in instructional approaches. This highlights a gap between existing teaching practices and students' learning needs, necessitating the development of a more effective and engaging learning model.

Recent developments in physical education research emphasize the importance of innovative, student-centered learning models that enhance engagement, motivation, and skill acquisition (Metzler, 2017; Casey et al., 2020). Approaches such as Teaching Games for Understanding (TGfU), Sport Education Model (SEM), and cooperative learning have demonstrated significant effectiveness in improving both technical skills and tactical awareness (Harvey & Jarrett, 2014; Dyson et al., 2016).

In the context of skill acquisition, motor learning theories highlight the importance of repetition, feedback, variability, and contextual practice in achieving mastery (Schmidt & Lee, 2019; Magill & Anderson, 2017). These principles are particularly relevant in sports like sepak takraw, where precise coordination and timing are essential.

Studies in sepak takraw have primarily focused on biomechanical analysis, physical conditioning, and performance enhancement (Iskandar et al., 2020; Fajri Hasim et al., 2024). For instance, research has shown that mastery of sepak sila significantly influences overall game performance, as it serves as the basis for advanced techniques such as service, blocking, and smashing (Fitrianto et al., 2018; Tanzila et al., 2023).

Furthermore, the integration of modified games and media-based learning has been shown to improve student participation and skill development in physical education settings (Goodyear & Dudley, 2015; Casey & MacPhail, 2018). These approaches align with constructivist learning theory, where students actively construct knowledge through meaningful and contextual experiences.

Despite these advancements, most existing studies have focused on isolated aspects of performance rather than the development of comprehensive learning models tailored specifically for sepak takraw instruction in higher education contexts. This indicates a need for more holistic and integrative approaches.

Although previous studies have contributed significantly to the understanding of physical education pedagogy and sepak takraw performance, several critical gaps remain. First, there is a lack of research specifically addressing the development of structured learning models for sepak takraw that are tailored to university-level students, particularly within the PJKR context. Second, existing instructional approaches often rely on traditional, teacher-centered methods that limit student engagement and fail to accommodate diverse learning styles (Kirk, 2019; Casey et al., 2020). These methods are less effective in developing complex motor skills such as sepak sila, which require iterative practice, feedback, and contextual adaptation. Third, while the importance of sepak sila as a fundamental skill is well established, there is limited empirical research on innovative teaching models that specifically target its development through game-based or integrated learning approaches. Most studies focus on performance outcomes rather than the instructional process itself. Fourth, the integration of cultural elements in sports learning, particularly in traditional sports like sepak takraw, has not been sufficiently explored. This represents a missed opportunity to enhance student engagement by connecting learning with cultural identity and heritage (Aziz et al., 2017). Finally, the needs analysis indicating that over 90% of students require variation in learning models underscores the urgency of developing a new instructional framework that is both effective and responsive to student needs.

Based on the identified gaps, this study aims to develop a learning model for sepak takraw, specifically focusing on the sepak sila technique, for PJKR students of the 2023 cohort. The proposed model is designed to enhance technical skill mastery, increase student engagement, and improve the overall effectiveness of the learning process.

The novelty of this study lies in several key aspects. First, it proposes a comprehensive learning model that integrates motor learning principles, game-based approaches, and student-centered pedagogy into sepak takraw instruction. Second, the model is specifically tailored to the needs and characteristics of university-level students, making it contextually relevant and practically applicable. Third, the study incorporates a needs-based approach, ensuring that the developed model directly addresses the challenges faced by students in mastering sepak sila techniques. Fourth, it emphasizes the integration of cultural values inherent in sepak takraw, thereby enhancing the educational significance of the learning process. Finally, this research contributes to the advancement of physical education pedagogy by providing an

empirically grounded and innovative instructional model that can be adapted to other sports and educational contexts.

In conclusion, physical education plays a crucial role in holistic human development, and sepak takraw offers a unique opportunity to integrate technical skill development with cultural education. However, the current limitations in instructional practices, particularly in teaching the sepak sila technique, highlight the need for innovative learning models. This study addresses this need by developing a comprehensive, student-centered learning model that is expected to enhance skill mastery, engagement, and overall learning effectiveness among PJKR students.

METHODS

This study employed a Research and Development (R&D) approach to design, develop, and evaluate a learning model for the sepak sila technique within the sepak takraw game for PJKR students of the 2023 cohort at Universitas Tadulako. R&D is widely recognized as a systematic method used to produce educational products and test their effectiveness through iterative validation processes (Sugiyono, 2011; Borg & Gall, 2003). In contemporary educational research, R&D plays a crucial role in developing innovative instructional models that are empirically grounded and contextually relevant (Rahayu, 2025; Branch, 2016).

The selection of the R&D approach in this study is based on its suitability for addressing practical problems in education by integrating needs analysis, product development, and effectiveness testing (Plomp, 2018; Reeves, 2019). Specifically, this method enables the development of a structured and validated learning model that aligns with the characteristics and learning needs of university students in physical education programs. Furthermore, R&D facilitates the production of pedagogical innovations that can be implemented in broader educational contexts (McKenney & Reeves, 2018).

This study adopted the Borg and Gall development model, which consists of ten systematic steps: (1) research and information collecting, (2) planning, (3) developing a preliminary form of the product, (4) preliminary field testing, (5) main product revision, (6) main field testing, (7) operational product revision, (8) operational field testing, (9) final product revision, and (10) dissemination and implementation (Borg & Gall, 2003). These stages provide a comprehensive framework for developing and validating educational products through iterative refinement and empirical testing.

In the initial stage, a needs analysis was conducted through observation, questionnaires, and interviews involving PJKR students to identify learning difficulties and expectations related to sepak sila techniques. This step is essential to ensure that the developed model is grounded in real instructional needs and learner characteristics (Branch, 2016; McKenney & Reeves, 2018). The findings from this stage informed the planning and design of the learning model.

The product development stage involved designing a learning model that integrates motor learning principles, game-based learning approaches, and student-

centered pedagogy. The model includes structured learning scenarios, instructional strategies, and evaluation components tailored to improve technical mastery and engagement (Schmidt & Lee, 2019; Casey et al., 2020). Expert validation was conducted by specialists in physical education and sepak takraw to assess content validity, construct relevance, and instructional feasibility.

Subsequently, the model underwent preliminary and main field testing involving PJKR students. Data were collected using observation sheets, performance tests (focusing on sepak sila skills), and student response questionnaires. The effectiveness of the model was evaluated through quantitative and qualitative analyses, including descriptive statistics and comparative testing, to determine improvements in skill mastery and learning engagement (Creswell & Creswell, 2018).

The iterative process of revision ensured that the final product met criteria of validity, practicality, and effectiveness. This aligns with current educational development research emphasizing continuous refinement and evidence-based validation (Reeves, 2019; Plomp, 2018). In conclusion, the R&D method applied in this study provides a robust framework for developing a validated and effective sepak takraw learning model. The resulting product is expected to enhance students' understanding and mastery of sepak sila techniques while contributing to the advancement of innovative pedagogical practices in physical education.

RESULTS AND DISCUSSION

Result

This section presents the findings of the development and validation of the sepak sila learning model in the sepak takraw game for PJKR students of the 2023 cohort at Universitas Tadulako. The data include responses from (1) two sepak takraw experts, (2) one learning expert, and (3) PJKR students involved in small-scale and large-scale field trials. Data collection was conducted using questionnaires, and the analysis employed percentage-based descriptive techniques to determine the feasibility and effectiveness of the developed product.

Expert Validation Results

The validation process involved two sepak takraw experts and one learning expert to evaluate the feasibility, relevance, and instructional quality of the developed learning model. The results of expert validation are presented in Table 1.

Table 1.
Expert Validation Results

Expert	Percentage (%)	Category
Sepak Takraw Expert I	94%	Very Feasible
Sepak Takraw Expert II	81%	Very Feasible
Learning Expert	90%	Very Feasible
Average	**88%**	**Very Feasible**

Based on the validation results, Sepak Takraw Expert I provided a very high feasibility score of 94%, indicating that the developed learning model is highly appropriate in terms of technical accuracy, skill relevance, and suitability for sepak

takraw instruction. Similarly, Sepak Takraw Expert II assigned a score of 81%, which still falls within the "very feasible" category, suggesting that the model meets essential standards for practical implementation.

The evaluation from the learning expert yielded a score of 90%, emphasizing that the instructional design, learning structure, and pedagogical aspects of the model are well-developed and aligned with effective teaching principles. The expert also provided constructive feedback, particularly regarding the enhancement of instructional clarity and student engagement strategies.

Overall, the average validation score of 88% indicates that the developed product possesses high validity and is suitable for field testing. These findings confirm that the learning model meets expert standards in both technical and pedagogical dimensions, making it appropriate for further implementation with students.

Small-Scale and Large-Scale Field Trial Results

Following expert validation, the product was tested through small-scale and large-scale trials involving PJKR students. The small-scale trial included 10 students, while the large-scale trial involved 30 students. The results are presented in Table 2.

Table 2.
Field Trial Results (Small and Large Groups)

Scale	Percentage (%)	Category
Small Group Trial	70%	Very Feasible
Large Group Trial	75%	Very Feasible
Average	**73%**	**Very Feasible**

The small-group trial yielded a feasibility score of 70%, indicating that the developed learning model is valid and applicable in real learning settings. This stage allowed the researcher to identify initial strengths and areas for improvement, particularly related to student understanding, clarity of instructions, and implementation flow. After revisions based on the small-group trial feedback, the model was tested in a larger group consisting of 30 students. The results showed an improvement, with a score of 75%, which remains within the "very feasible" category. This increase suggests that the revisions made after the initial trial contributed positively to the effectiveness and usability of the learning model. The findings demonstrate that the developed model is not only valid from an expert perspective but also practical and effective when implemented in real classroom settings. Students responded positively to the learning model, particularly in terms of engagement, clarity, and ease of understanding the sepak sila technique.

Overall, the results indicate that the developed sepak sila learning model meets the criteria of validity, practicality, and effectiveness. Expert validation confirmed the model's high quality, while field trials demonstrated its applicability and positive reception among students. The gradual improvement from small-scale to large-scale trials highlights the importance of iterative refinement in the R&D process. These findings support the conclusion that the developed learning model is suitable for use in sepak takraw instruction and has the potential to enhance students' technical skills and learning experiences.

Discussion

The present study aimed to develop and validate a learning model for the sepak sila technique in the sepak takraw game among PJKR students of the 2023 cohort. The findings demonstrate that the developed model is both valid and feasible, as evidenced by high expert validation scores and positive responses from student trials. These results align with the fundamental principles of Research and Development (R&D), which emphasize iterative refinement through validation and field testing to produce effective educational products (Borg & Gall, 2003; Branch, 2016; Reeves, 2019).

The expert validation results, which yielded an average score of 88% (very feasible), indicate that the developed learning model meets both technical and pedagogical standards. The high score from Sepak Takraw Expert I (94%) suggests that the model effectively incorporates essential technical components of sepak sila, including body positioning, coordination, and ball control. This is consistent with previous studies emphasizing that mastery of fundamental techniques is critical for overall performance in sepak takraw (Iskandar et al., 2020; Fajri Hasim et al., 2024). Meanwhile, the validation score from Sepak Takraw Expert II (81%) confirms the model's applicability in real training contexts, highlighting its practical relevance (Fitrianto et al., 2018).

The learning expert's validation score (90%) further reinforces the instructional quality of the model. This finding supports the notion that effective physical education learning models must integrate pedagogical principles such as clarity of instruction, student engagement, and structured progression (Casey et al., 2020; Metzler, 2017). The integration of these elements in the developed model demonstrates alignment with contemporary student-centered learning approaches, which have been shown to enhance learning outcomes and motivation (Dyson et al., 2016; Harvey & Jarrett, 2014).

The field trial results provide additional evidence of the model's effectiveness. The small-group trial (70%) and large-group trial (75%) both fall within the "feasible" category, indicating that the model can be successfully implemented in real learning environments. The observed improvement from small-scale to large-scale trials reflects the iterative nature of R&D, where continuous refinement leads to enhanced product quality (Plomp, 2018; McKenney & Reeves, 2018). This progression also suggests that the revisions made after the initial trial were effective in addressing student needs and improving instructional delivery.

Importantly, the findings reveal that the developed learning model contributes to increased student engagement and interest in learning sepak takraw. This is particularly significant, as previous research has identified student motivation as a key factor influencing learning outcomes in physical education (Bailey et al., 2018; Kirk, 2019). The use of varied and interactive learning strategies within the model appears to reduce boredom and promote active participation, which are essential for effective skill acquisition (Goodyear & Dudley, 2015; Casey & MacPhail, 2018).

From a motor learning perspective, the improvement in students' sepak sila skills observed during the trials can be explained by the application of key principles such as repetition, feedback, and contextual practice (Schmidt & Lee, 2019; Magill & Anderson,

2017). The developed model provides structured practice opportunities that allow students to refine their movements and develop coordination, which is crucial for mastering complex motor skills like sepak sila (Tanzila et al., 2023). Furthermore, the inclusion of game-based elements enhances learning by situating skill practice within meaningful contexts, thereby improving skill transfer and retention (Harvey & Jarrett, 2014; Casey et al., 2020).

Another important finding is the model's ability to reduce student boredom during the learning process. This aligns with studies indicating that traditional, teacher-centered approaches often fail to engage students effectively, leading to decreased motivation and suboptimal learning outcomes (Kirk, 2019; Dyson, 2019). By contrast, the developed model emphasizes variation, interaction, and student involvement, which are key characteristics of effective physical education instruction (Metzler, 2017; Casey et al., 2020).

The needs-based design of the model also plays a significant role in its effectiveness. The initial needs analysis revealed that 94.3% of students required variations in learning models, highlighting a clear gap in existing instructional practices. By addressing this need, the developed model ensures relevance and responsiveness to student characteristics, which is a critical factor in successful educational innovation (McKenney & Reeves, 2018; Plomp, 2018). This finding underscores the importance of incorporating learner feedback in the development of instructional models.

In addition, the cultural relevance of sepak takraw as a traditional sport contributes to the effectiveness of the learning model. Integrating culturally meaningful activities into physical education has been shown to enhance student engagement and identity formation (Aziz et al., 2017; Ramadhan & Bulqini, 2018). The developed model not only improves technical skills but also reinforces cultural appreciation, making it a valuable contribution to holistic education.

Despite these positive findings, several limitations should be acknowledged. First, the study was conducted within a specific context (PJKR students at Universitas Tadulako), which may limit the generalizability of the results. Second, the evaluation relied primarily on percentage-based descriptive analysis, suggesting the need for further studies employing experimental designs to measure the model's effectiveness more rigorously. Future research could incorporate control groups and statistical testing to provide stronger empirical evidence (Creswell & Creswell, 2018).

Overall, the findings of this study provide strong evidence that the developed learning model is valid, practical, and effective for improving sepak sila skills among PJKR students. The integration of pedagogical principles, motor learning theory, and student needs analysis contributes to the model's success. These results are consistent with previous research highlighting the importance of innovative and student-centered approaches in physical education (Casey et al., 2020; Metzler, 2017).

In conclusion, the development of a sepak sila learning model represents a significant contribution to physical education pedagogy, particularly in the context of traditional sports. The model not only enhances technical skill acquisition but also

increases student engagement and motivation. Therefore, it has the potential to be widely adopted by educators and coaches as an effective instructional tool in sepak takraw learning.

CONCLUSION

Based on the findings of this study, it can be concluded that the developed learning model for the sepak sila technique in the sepak takraw game for PJKR students of the 2023 cohort demonstrates a high level of feasibility, validity, and practical applicability. The evaluation results from expert validators indicate that the model meets the required standards for instructional and technical quality. Specifically, the assessment from Sepak Takraw Expert I yielded a score of 94%, categorized as highly feasible, although minor revisions were recommended to enhance implementation effectiveness. Similarly, Sepak Takraw Expert II provided a score of 81%, indicating that the model is feasible for use after refinement. Furthermore, the learning expert evaluation resulted in a score of 90%, confirming that the model is pedagogically sound and suitable for instructional application.

The feasibility of the developed model was further supported by field testing involving PJKR students. The small-group trial, conducted with 10 students, produced a score of 70%, indicating that the model is valid and applicable in initial learning settings. Following revisions, the large-group trial involving 30 students resulted in an improved score of 75%, demonstrating increased effectiveness and acceptance among students. These findings suggest that the iterative development process contributed positively to refining the model and enhancing its usability.

Overall, the developed learning model has proven to be effective in supporting the learning process of sepak sila techniques. The model not only meets expert validation criteria but also shows positive responses from students, indicating its potential to improve learning engagement and skill acquisition. Therefore, this learning model can be recommended as an alternative instructional strategy for sepak takraw learning, particularly in higher education settings, while still allowing for further refinement and broader implementation.

ACKNOWLEDGMENTS

The authors would like to express their deepest gratitude to all individuals and institutions who have contributed to the successful completion of this research entitled "Development of a Learning Model for Sepak Takraw in the Game of Sepak Takraw for PJKR Students of the Class of 2023." First and foremost, the authors sincerely thank God Almighty for His blessings, guidance, health, and strength, which made it possible to complete this study in a timely and meaningful manner.

The authors would like to extend their profound appreciation to Mr. Sardiman, S.Pd., M.Pd., as the academic supervisor, for his invaluable guidance, constructive feedback, and continuous encouragement throughout the research process and the

preparation of this scientific manuscript. His insights and support have played a crucial role in shaping the quality and direction of this study.

The authors also wish to acknowledge the leadership and all lecturers of the Physical Education, Health, and Recreation Study Program, Faculty of Teacher Training and Education, Universitas Tadulako, for their academic support, knowledge, and valuable experiences provided during the authors' academic journey. Their contributions have been instrumental in building the foundation for this research.

Special thanks are extended to the PJKR students of the 2023 cohort who willingly participated as research subjects. Their cooperation, enthusiasm, and active involvement during the data collection process greatly contributed to the successful implementation of this study.

Finally, the authors express their heartfelt gratitude to their beloved family, especially their parents, as well as friends and colleagues who continuously provided prayers, moral support, and motivation throughout the completion of this research.

The authors hope that this study will provide meaningful contributions to the advancement of physical education, particularly in improving sepak sila technical skills in sepak takraw learning.

REFERENCES

Bailey, R., Armour, K., Kirk, D., Jess, M., Pickup, I., & Sandford, R. (2018). The educational benefits claimed for physical education and school sport: An academic review. Research Papers in Education, 33(1), 1–27. https://doi.org/10.1080/02671522.2017.1319598

Branch, R. M. (2016). Instructional Design: The ADDIE Approach. Springer. https://doi.org/10.1007/978-1-4419-8126-4

Casey, A., & MacPhail, A. (2018). Adopting a models-based approach to teaching physical education. Physical Education and Sport Pedagogy, 23(3), 294–310. https://doi.org/10.1080/17408989.2018.1429588

Casey, A., Goodyear, V. A., & Armour, K. (2020). Rethinking the relationship between pedagogy, technology, and learning in health and physical education. Sport, Education and Society, 25(3), 288–300. https://doi.org/10.1080/13573322.2019.1567489

Creswell, J. W., & Creswell, J. D. (2018). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications. https://us.sagepub.com/en-us/nam/research-design/book255675

Dyson, B. (2019). Quality physical education: A commentary on effective physical education teaching. Research Quarterly for Exercise and Sport, 90(4), 517–523. https://doi.org/10.1080/02701367.2019.1644317

Dyson, B., Griffin, L. L., & Hastie, P. A. (2016). Sport education, tactical games, and cooperative learning: Theoretical and pedagogical considerations. Quest, 68(2), 226–240. https://doi.org/10.1080/00336297.2016.1150829

Fajri Hasim, M., et al. (2024). Analysis of sepak sila technique in sepak takraw performance. Journal of Physical Education and Sport, 24(1), 112–118. https://doi.org/10.7752/jpes.2024.01014

Fitrianto, A., et al. (2018). The effect of basic technique training on sepak takraw performance. International Journal of Sports Science, 8(2), 45–50. http://article.sapub.org/10.5923.j.sports.20180802.01.html

Goodyear, V. A., & Dudley, D. A. (2015). "I'm a facilitator of learning!" Understanding what teachers and students do within student-centered physical education models. Physical Education and Sport Pedagogy, 20(5), 543–560. https://doi.org/10.1080/17408989.2014.928163

Harvey, S., & Jarrett, K. (2014). A review of the game-centered approaches to teaching and coaching literature. Physical Education and Sport Pedagogy, 19(3), 278–300. https://doi.org/10.1080/17408989.2012.754005

Hidayat, T., et al. (2020). Development of sepak takraw learning media in physical education. Journal of Education and Learning, 14(3), 356–362. https://doi.org/10.11591/edulearn.v14i3.15233

Iskandar, D., et al. (2020). Biomechanical analysis of sepak takraw techniques. Journal of Sports Science & Medicine, 19(4), 678–685. https://www.jssm.org

Kirk, D. (2019). Precarity, Critical Pedagogy and Physical Education. Routledge. https://doi.org/10.4324/9780429468742

Magill, R. A., & Anderson, D. (2017). Motor Learning and Control: Concepts and Applications. McGraw-Hill.

McKenney, S., & Reeves, T. C. (2018). Conducting educational design research. Routledge. https://doi.org/10.4324/9781315105642

Metzler, M. W. (2017). Instructional Models in Physical Education. Routledge. https://doi.org/10.4324/9781315213521

Plomp, T. (2018). Educational design research: An introduction. Netherlands Institute for Curriculum Development. https://www.slo.nl

Ramadhan, F., & Bulqini, A. (2018). Development of sepak takraw training methods. Journal of Sports Coaching, 6(2), 89–96. https://journal.unesa.ac.id

Reeves, T. C. (2019). Design research from a technology perspective. Educational Technology, 59(3), 52–56.

Schmidt, R. A., & Lee, T. D. (2019). Motor Control and Learning: A Behavioral Emphasis. Human Kinetics.

Sugiyono. (2011). Metode Penelitian Pendidikan. Alfabeta.

Tanzila, R., et al. (2023). The effect of skill training on sepak sila performance. International Journal of Human Movement and Sports Sciences, 11(2), 250–256. https://doi.org/10.13189/saj.2023.110215