



A Case Study : Development of Modified Physical Education Learning Equipment to Increase Students' Learning Enthusiasm and Interest in Sports

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Abstract

Physical Education, Sports, and Health (PE) instruction in elementary schools continues to encounter several challenges, including inadequate infrastructure, limited variation in instructional strategies, and low levels of student engagement in physical activities. These constraints highlight the necessity for innovative approaches to learning, one of which involves the development of modified instructional equipment tailored to the characteristics and needs of students. This study aims to analyze the role of modified PE learning equipment in enhancing students' enthusiasm for learning and their interest in sports activities at the elementary school level. The research adopts a Systematic Literature Review (SLR) approach by critically examining a range of prior studies relevant to the development of learning media and equipment modification in physical education. The review process involves systematic stages of identification, selection, and analysis of scholarly articles focusing on innovations in instructional media, sports-based learning activities, and equipment modification. The findings indicate that the implementation of modified PE learning equipment significantly contributes to increased student participation, improved motor skill development, heightened learning motivation, and greater interest in sports. Learning media designed with innovative and game-based approaches are proven to foster a more engaging, interactive, and enjoyable learning environment, thereby encouraging students to participate more actively in physical education activities. In conclusion, the development of modified PE learning equipment represents a viable and effective alternative for improving the quality of physical education instruction in elementary schools, while simultaneously promoting a more active and positive attitude toward sports among students.

How to Cite

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INTRODUCTION

Education constitutes a fundamental process in fostering the holistic development of students, encompassing cognitive, affective, and psychomotor domains (Nurjadid et al., 2025). One of the key subjects that contributes significantly to the development of physical capabilities, motor skills, and character formation is Physical Education, Sports, and Health (PE) (Sari et al., 2024). The objectives of Physical Education (PE) extend beyond enhancing physical fitness; it also plays a crucial role in instilling values such as sportsmanship, teamwork, discipline, and the cultivation of healthy lifestyle habits from an early age (Andriansyah et al., 2025). In this context, active student engagement becomes a vital element in ensuring the optimal achievement of learning outcomes. Therefore, PE instruction should be systematically designed to be engaging, diverse, and aligned with the developmental characteristics of elementary school learners.

From a theoretical perspective, the effectiveness of PE learning is highly dependent on the appropriate use of instructional media and learning tools. Learning media function as supportive instruments that assist teachers in delivering instructional content while simultaneously facilitating students in understanding and practicing various motor skills (Rumawatine, 2023). Within the scope of physical education, the modification of learning equipment represents a strategic approach to adjusting sports activities according to students' abilities and needs (Rubiana et al., 2025). Such modifications may involve alterations in size, shape, materials, and methods of use, making the equipment safer, more appealing, and more accessible for elementary school students. Consequently, these adaptations can create a more enjoyable learning experience and significantly enhance students' motivation and participation in sports activities (Indarto, 2014).

One methodological approach that can be employed to foster innovation in learning is Research and Development (R&D). This approach is intended to produce educational products through a systematic process involving design, testing, and evaluation stages (Okpatrioka, 2023). Through the application of R&D, learning products are not only conceptually developed but also empirically tested to ensure their feasibility and effectiveness in practical educational settings (Waruwu, 2024). Therefore, the development of modified PE learning equipment using an R&D approach is expected to generate products

that are relevant to students' needs and capable of improving the overall quality of the learning process.

Based on preliminary observations conducted at Public Elementary School 021 Samarinda Ulu, several challenges were identified in the implementation of PE learning, particularly related to the limited variety of learning equipment utilized in sports activities. The available equipment is relatively insufficient and, in some cases, has not been adequately adapted to the characteristics of elementary school students. This condition has implications for the limited variation in instructional activities carried out by teachers, which in turn leads to decreased student enthusiasm in participating in sports activities. This phenomenon is reflected in the low level of student participation during practical sessions, reduced enthusiasm in game-based activities, and limited interest in engaging with the various sports activities presented during PE lessons.

Research conducted indicates that the utilization of instructional media and the modification of learning equipment can enhance the effectiveness of Physical Education (PE) learning. Furthermore, previous studies have demonstrated that modifying sports equipment can improve student engagement in learning activities and facilitate the mastery of fundamental motor skills (Maryani et al., 2025). In addition, the integration of innovative learning media has been shown to increase learning motivation, students' interest in sports activities, and their active participation in PE learning processes (Musto et al., 2025).

Based on these conditions, the novelty of this research does not merely lie in the development of game-based or modified equipment, as such topics have been widely explored in previous studies. Instead, the distinct contribution of this study is found in the contextual design of equipment modifications that are specifically tailored to the learning conditions, available facilities, and student characteristics at Public Elementary School 021 Samarinda Ulu. Moreover, this study examines the implementation of these modifications in depth through a case study approach. It provides an empirical description of how locally adapted equipment modifications can serve as practical learning solutions to address facility limitations while simultaneously enhancing student engagement and interest in physical education learning.

The formulation of the research problem

focuses on how modified Physical Education (PE) learning equipment is implemented within the learning process and how its utilization contributes to increasing students' learning enthusiasm and interest in sports at Public Elementary School 021 Samarinda Ulu. In accordance with this problem formulation and the case study approach, this study aims to describe the implementation of modified PE learning equipment, analyze its practicality in supporting the instructional process, and examine its influence on students' learning enthusiasm and interest in sports at public elementary school 021 samarinda ulu.

METHOD

This study employs a Systematic Literature Review (SLR) approach to critically analyze previous research related to the modification of Physical Education (PE) learning equipment and its role in enhancing students' learning enthusiasm and interest in sports. The SLR method is utilized to systematically identify, evaluate, and synthesize relevant scientific studies in order to develop a comprehensive understanding of the topic (Sudarnice et al., 2025). In this context, the key indicators examined include students' learning enthusiasm, interest in sports, active participation, and motor skill development, while the parameters are reflected in measurable aspects such as the level of student engagement, frequency of participation, observed motivation, and improvement in basic movement skills reported in the reviewed studies.

The research design follows several structured stages, including: (1) formulation of research questions, (2) systematic literature search, (3) selection of articles based on inclusion and exclusion criteria, (4) data extraction using a literature review matrix, (5) data analysis and synthesis, and (6) drawing conclusions based on the integrated findings of the selected studies (Qudratuddarsi et al., 2024). The research questions are formulated based on specific indicators, namely how modified PE learning equipment influences student motivation, learning engagement, and interest in sports, with parameters including qualitative and quantitative findings such as behavioral changes, participation rates, and reported learning outcomes in the literature.

The literature search was carried out using various scientific databases, such as Google Scholar, as well as national and international journals and other academic publications relevant to Physical Education learning, modification of learning

equipment, and students' motivation or interest in sports (Setiyo, 2017). The search process applied specific parameters, including publication relevance, keyword suitability, and accessibility of full-text articles, while the keywords used included "modification of PE learning equipment," "physical education learning media," "students' interest in sports," and "motivation in physical education learning."

The inclusion criteria for selecting articles were defined based on clear indicators and parameters, including: (1) studies that explicitly discuss PE learning equipment modification as the main indicator, (2) studies examining student-related outcomes such as motivation, participation, or interest as key indicators, (3) articles published in reputable scientific journals within the last ten years as a temporal parameter, and (4) articles providing complete methodological and result descriptions. Exclusion criteria included studies that did not meet these indicators, lacked empirical evidence, or were not relevant to the research focus (Wada et al., 2024).

The research instrument used in this study was a literature review matrix designed to systematically record important information from each selected article, including the author(s), year of publication, research objectives, research methods, subjects, and key findings. The indicators recorded in the matrix include types of equipment modification, forms of learning media, and student outcomes, while the parameters include the effectiveness level, implementation context, and reported impact on student motivation and participation. This instrument ensured consistency and objectivity in the data extraction process.

The subjects of this study consist of various scientific literature sources, including journal articles, conference proceedings, and academic publications discussing Physical Education learning, equipment modification, and student motivation or interest in sports. Therefore, this study does not involve direct respondents. The object of the research is the concepts and empirical findings related to modified PE learning equipment, with indicators focusing on learning effectiveness and student engagement, and parameters including participation intensity, behavioral responses, and learning outcomes reported in previous studies.

The data used in this study are secondary data obtained from previous research and scientific publications. These data include theoretical frameworks, research methodologies, and empirical findings relevant to the research topic. The parameters of the data include validity, relevance,

and consistency of findings across different studies.

Data collection was conducted through a systematic and comprehensive literature search process across multiple scientific sources. The selected articles were then analyzed using qualitative descriptive analysis techniques. The data were categorized based on thematic indicators such as types of equipment modification, innovation in learning media, student participation, and learning motivation (Sarosa, n.d.). Furthermore, a synthesis process was carried out by comparing parameters such as effectiveness, implementation outcomes, and consistency of results across studies to generate integrated findings (Mas'odi et al., 2024).

The results of this analysis are expected to provide a comprehensive overview of how modified Physical Education (PE) learning equipment contributes to improving students' learning enthusiasm and interest in sports. The final synthesis emphasizes key indicators such as increased motivation, active participation, and skill development, with parameters reflected in measurable improvements reported across the reviewed literature. In addition, the findings are intended to serve as a theoretical and practical reference for enhancing the quality of Physical Education learning in elementary schools.

RESULTS AND DISCUSSION

Based on **Table 1**. Literature review of various relevant studies, it is clear that innovation in learning media and equipment plays a crucial role in improving the quality of the Physical Education, Sports, and Health (PE) learning process. PE learning not only aims to improve students' physical abilities but also to foster their interest, motivation, and active involvement in sports activities. Therefore, developing and modifying learning media is one strategy that can be used to create a more engaging and effective learning process.

Several studies have shown that the use of modified learning media or tools can help students understand learning materials more easily. Modified sports equipment allows students to practice at a level of difficulty appropriate to their abilities. This is evidenced by research showing that the development of modified learning media in PE learning can improve the movement skills and physical fitness of elementary school students (Utomo, Muhyi, & Wiyarno, 2020). By modifying learning media, students can engage in physical activities more actively and enjoyably,

thus optimally achieving learning objectives.

Furthermore, the use of interactive learning media can also increase student engagement in the learning process. Innovatively designed learning media can provide a more varied learning experience than conventional learning methods. Research conducted by Sahabuddin, Hakim, Ishak, and Fadillah (2025) shows that developing interactive learning media based on basic sports techniques can increase student active participation in Physical Education (PE) learning. Engaging learning media can increase learning motivation and help students better understand sports concepts and techniques.

Game-based learning approaches have also proven effective in increasing student interest in sports activities. Learning models packaged in the form of games can create a more enjoyable learning atmosphere, resulting in more enthusiastic student participation in learning activities. Research conducted by Sebastian, Puspodari, Pratama, and Himawanto (2025) shows that developing modified traditional games in PE learning can improve students' gross motor skills, such as balance, coordination, and agility. Furthermore, traditional games can also enhance students' social interaction and foster the value of cooperation in learning activities.

The use of a learning model based on modified basic sports techniques also has a positive impact on student participation in learning activities. Research conducted by Sahabuddin, Hakim, Ishak, and Fadillah (2025) shows that developing a Physical Education (PE) learning model based on modified basic sports techniques significantly increases student active participation. Through this innovative learning approach, students become more interested in participating in learning activities and become more active in physical activity.

Furthermore, developing games as a learning medium for PE can also improve students' learning motivation and motor skills. Research conducted by Sebastian, Firmantomo, Harwanto, and Suharti (2025) on the development of Firdorr Games showed that modified games can increase students' physical activity, learning motivation, and teamwork. The results of this study indicate that game-based learning media has a very high level of feasibility and receives positive responses from students, as it is considered an interesting, interactive, and enjoyable learning process.

Based on these various studies, it can be concluded that developing modified media and equipment for PE learning has a significant im-

Table 1. Literature review

Research Title	Authors	Year	Key Findings
Development of softball to develop basic volleyball technique skills and coordination in elementary schools	Eka Supriatna & Muhammad Suhairi	2021	The development of soft ball media was declared suitable for use in PE learning and was able to improve basic movement skills and coordination of elementary school students (Supriatna & Suhairi, 2021).
Implementation of Articulate Storyline Interactive Learning Media to Increase Student Learning Interest	Catur Prima Eka Putra Abdullah, Haeruddin Azhari, M. Azy Ari	2024	Technology-based interactive learning media increases students' interest and learning interest in PE learning (Abdullah et al., 2024).
Development of Adventure Education-based game design for elementary school students' motor skills	Siska Amalia, Asep Ardiyanto, Husni Wakhjudin	2025	Adventure education-based game models are able to improve motor skills and student involvement in physical education learning activities (Amalia et al., 2025)
Development of a circuit game model to improve children's basic motor skills	Fatih Muzakki, Nanik Indahwati, Dwi Cahyo Kartiko	2025	Circuit games have been proven to improve students' basic movement skills and increase students' enthusiasm in participating in sports learning (Muzakki et al., 2025).
Development of tic-tac-toe media for relay race learning	Rohman Ardiansyah Prakoso, Ari Wibowo Kurniawan, Mudji Slamet	2025	Modified tic tac toe game media can increase learning motivation and make PE learning more interesting and interactive (Prakoso et al., 2025).
Development of interactive learning media based on basic basketball techniques to increase student active participation	Sahabuddin, Hikmad Hakim, Muhammad Ishak, Arman Fadillah	2025	The interactive learning media developed is able to significantly increase students' active participation in PE learning (Hakim et al., 2025).
Development of the traditional game Gedang (Gedrik Egrang) for elementary school students	Rizal Agus Sebastian, Puspodari, Budiman Agung Pratama, Wasis Himawanto	2025	Modifying traditional games can increase students' interest in sports while developing motor skills such as balance and coordination (Sebastian et al., 2025) .
Development of modified learning media to improve physical fitness in elementary school students	Maris Aka Satriyo Utomo, Muhammad Muhyi, Yoso Wiyarno	2025	Modification of game-based learning media has been proven to be able to improve students' physical fitness and make learning more enjoyable (Utomo et al., 2020).
Development of a physical education (PE) learning model based on modified basic badminton techniques to increase student active participation	M. Imran Hasanuddin	2020	The learning model based on modification of basic sports techniques increases students' active participation by up to 83% and improves sports skills (Ishak & Hasanuddin, 2025).
Development of Firedorr Games in PE learning for elementary school students	Arnol Firmantomo, Harwanto, Suharti	2025	The Firedorr Games game developed using the ADDIE model was assessed as very feasible (average validation of around 92%) and was able to increase physical activity, learning motivation, motor skills, and student cooperation in PE learning (Firmantomo et al., 2025).

pact on increasing students' enthusiasm for learning and interest in sports. Innovative and creative learning media can create a more interactive, enjoyable learning process that is tailored to student characteristics. Therefore, the development of modified learning equipment in PE is an alter-

native solution that can be implemented to improve the quality of physical education learning in elementary schools, especially in increasing students' enthusiasm for learning and interest in sports.

CONCLUSION

In summary, the analysis of the reviewed literature highlights that the modification of learning media and equipment in Physical Education, Sports, and Health (PE) significantly contributes to improving the quality of the instructional process. The utilization of modified tools, interactive media, and creatively designed game-based activities has been shown to establish a more engaging, enjoyable, and developmentally appropriate learning environment for elementary school students.

Furthermore, evidence from various studies demonstrates that the implementation of modified learning media is closely associated with enhancements in students' motor skills, physical fitness, and levels of active participation during PE lessons. The incorporation of game-based learning approaches also plays a crucial role in fostering higher learning motivation, increasing students' interest in sports, and encouraging more active involvement in physical activities. As a result, these innovations contribute to a more dynamic and participatory learning atmosphere.

Ultimately, the application of modified PE learning equipment represents an effective instructional strategy for strengthening students' enthusiasm for learning and their interest in sports. Such innovations facilitate better understanding of learning materials while promoting interactive, creative, and meaningful learning experiences. Therefore, the modification of PE learning equipment can serve as a practical and relevant solution for enhancing the quality of physical education in elementary schools, particularly in encouraging sustained student engagement in physical activity.

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