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Development of Bola Tepak Game Model for Physical Education (PE) Instruction at Madrasah Tswanawiyah 1 Palembang

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Abstract

Physical education (PE) requires innovative and enjoyable learning models to improve students' motor skills, motivation, and engagement. Traditional striking-based games are often less contextualized with students' developmental characteristics, leading to limited skill acquisition and reduced participation. Therefore, this research aims to develop a Bola Tepak game-based learning model for PE instruction at Madrasah Tsanawiyah 1 Palembang and to describe its validity and practicality. This research employed a Research and Development (R&D) approach using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The participants included 7th-grade students as users and expert validators consisting of learning experts, content specialists, and media developers. Data collection techniques consisted of expert validation sheets, observation sheets, questionnaires, and field implementation tests. Validation results indicated that the model was feasible to implement, with an average score of 84% from learning experts, 86% from content experts, and 83.3% from media experts. Practicality testing involving students demonstrated positive implementation outcomes, with an average acceptance score of 88.1% and positive responses toward five game variations: Single Target Tepak, Chain Cone Tepak, Rolling Ball Tepak, Score Zone Tepak, and Team Relay Tepak. The findings show that the model enhances students' striking skills, coordination, concentration, teamwork, and learning motivation. In conclusion, the Bola Tepak game-based learning model is valid, practical, and feasible to be used as an innovative and enjoyable alternative instructional strategy for PE.

How to Cite

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INTRODUCTION

Sports, Health and Physical Education (PE) is one of the national educational system's components which aims to develop students' holistic potentials such as physical emotional social. This teaching field develops not only physical fitness and motor skills but also self-confidence, leadership, the ability to make decisions in dynamic and situation tasks. (Ma'arif & Prasetiyo, 2021) . Learning also involves the development of direct personal experience through which students are given opportunities to communicate in creative, confident and competent ways. (Putra, Gustiawati, & Julianti, 2020). Mini-ball games to promote cooperation, speed of thinking and quick motor responses During mini-ball games the student is challenged to participate in activities that require cooperation, speedy thinking and swift motor reactions (Mahendra et.al, 2024). Moreover, such activity contributes to developing social skills and competencies such as tolerance and good sportsmanship that are important in formation of character. (Pratama, & Amiq, 2019).

Physical education provides students with opportunities to continue their development in the areas of affective, cognitive, and psychomotor domains.These are competences which prepare them for an active and healthy life through out their lives (Supriadi et.al, 2022). Manipulative movement skills are an essential competence in the small-ball games that needs to be instructed to achieve students understanding of how their bodies move and coordinate for application throughout life. Skills including throwing, catching, kicking and striking form a fundamental basis for children's later acquisition of more advanced motor skills. (Lanos et.al, 2024). Dexterous motor control is an emergent property of muscle, bone and joint mechanics such that movements are effective and efficient. Thus, aspects of this set such as energy utilization, muscular contraction, neural control and bone or joint action forms the components of neuromuscular manipulative motor skills. (Paulima et.al, 2024)(Dlis, 2018). Manipulative movements play a very significant role for the students, these can be practiced through training the learning models that are adapted to the characteristics of learners.

Based on the results of observations conducted in Madrasah Tswanawiyah 1 Palembang, there are some problems in learning process of PE especially based on small ball game materials that directly affect the quality of learning. 1) lack of variety in learning, where the methods and models used tend to be monotonous and uninnovative. Learning only focuses on delivering the material theoretically or with the same game pattern, so that students feel bored and lack enthusiasm in participating in activities. 2) Limited facilities and facilities, such as the absence of adequate courts and lack of game equipment, cause learning activities to be not optimal, especially since small ball games require ample space and appropriate tools. 3) low student participation, as seen from the lack of active involvement of students in learning activities. Many students are passive, lack confidence, or find it difficult to follow games that require movement coordination skills, due to a learning approach that is less attractive and not tailored to their skill level. 4) there is no availability of contextual and adaptive small ball game learning models, namely learning models that are in accordance with the characteristics of students, school environment conditions, and the learning objectives of PE itself. The absence of this model makes it difficult for teachers to develop learning that is fun, meaningful, and able to improve students' motivation and skills as a whole.

Some innovative solutions can be taken to overcome problems in the teaching of PE at the 1 st Madrasah Tswanawiyah Palembang, especially for small ball game activities. One potential way forward is develop diverse and engaging learning model that incorporate traditional game-like facets, e.g Bola Tepak in stroking, running and catching action. Finger-ball games were assumed to enhance students' finemotor skills, gross motor skills, coordination and agility as well as their social behavior ie thebehavior of working together in a small-group with respect to rules. this work claim that (Diri & Priambodo, 2023) (Lanos et. al, 2023), the establishment of a small ball games variation model can greatly enhance students' learning interest and learning motivation, "as these games create an interesting and challenging learning environment". Furthermore, the study of (Angreza & Purwanto, 2023) found that learning PE with a small ball game approach can improve students' manipulative ability who managed to throw, catch and hit (Ritonga et.al, 2024). Small ball games are also flexible because they Small ball games are also flexible, they can be adapted to the level of student ability and narrow learning conditions and are one of the important ways in forming intellectual, emotional, and physical intelligent students (Susanto et al., 2022). Small ball games developed are very appropriate for applying in learning PE in MTS due to the fact that the types of development are adjusted to students' characteristics at an active, dynamic, and competitive period. The purpose of this

research is to develop a Bola Tepak game-based learning model that aligns with those characteristics and supports more engaging and effective PE instruction.

METHODS

This research used the Research and Development (R & D) method with reference to ADDIE learning development model system that stands for analysis, design, development, implementation and evaluation. This model has been selected to be applied since it posses a systematic, flexible steps .(Pribadi, 2009). The five stages of A.D.D.I.E. are explained below in this graphic:

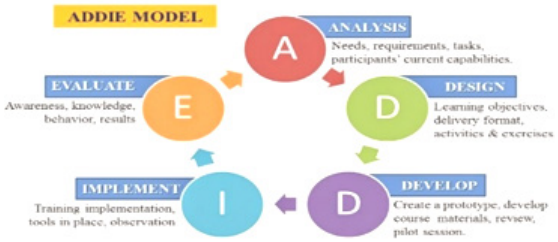

Figure 1. The ADDIE Stages

The research process adopts the ADDIE development model which consists of five systematic stages, namely: (1) Analysis, carried out to identify needs, analyze learning problems, student characteristics, basic competencies, and the condition of facilities and infrastructure; (2) Design, which is designing a learning model including objectives, materials, scenarios, game rules, and assessment instruments; (3) Development, which is realizing the design into an initial product, followed by validation by material experts and learning experts, as well as revision based on the input obtained; (4) Implementation, which is a limited trial to students to determine the practicality and response to the product; and (5) Evaluation, which is an assessment carried out at each stage of development to improve the product to make it suitable for use. This is intended to prevent that the resulting products are only as needed, but they are deemed not feasible and not applicable to be implemented in the learning of PE.

The focus of this research was the 7th-grade students of Madrasah Tsanawiyah 1 Palembang because they were the target group for the development of small ball game learning through play. This target selection was intended to represent the MTs level in Palembang City as the basis for examining the feasibility and practicality of the learning model. The research subjects consisted of 7th-grade students and PE teachers who were directly involved in testing the small ball game learning model through the play method. Data were collected through expert validation sheets, student and teacher questionnaires, observation, and product try-out assessments. The data obtained were analyzed quantitatively using descriptive statistics to determine feasibility and practicality scores, and qualitatively to interpret user responses and implementation findings.

RESULTS AND DISCUSSION

The results of this research were compiled systematically by following the stages of developing the ADDIE model, which included five main steps: analysis, design, development, implementation, and evaluation. Each stage is carried out sequentially and interrelated to ensure that the Bola Tepak game model developed is really in accordance with the characteristics and needs of grade VII Madrasah Tswanawiyah 1 Palembang students.

Analysis

This stage is an important basis for designing a game model that is relevant, contextual, and in accordance with the development of MTs level students who need a meaningful, conscious, and encouraging learning approach. To obtain comprehensive information, interviews were conducted with PE teachers and questionnaires were distributed to grade VII students. Based on the results of the interview, it was obtained that learning the game of Football at Madrasah Tswanawiyah 1 Palembang is still not optimal. Learning tends to be done conventionally, lacks variety, and has not integrated systematic and interesting game activities for students. Teachers state that students get bored easily, lack understanding of basic techniques, and are not fully actively involved in the learning process. Although the material is already listed in the curriculum document, its implementation in the field has not yet implemented a game model that is innovative, fun, and in harmony with the needs of early adolescent development. The researcher also distributed questionnaires to 35 grade VII students to get a first-hand look at Student learning experience, which is outlined in the **Table 1**.

Table 1. Results of Needs Analysis for the Development of the Bola Tepak Learning Model

Assessed Aspect	(%)	Category
Students' interest in the Bola Tepak game	80%	Good
Clarity of instruction delivered by the teacher	74,8%	Moderate
Level of student participation during learning activities	69,7%	Moderate
Students' enjoyment in participating in the learning activities	83,4%	Good
Students' difficulties/obstacles in playing Bola Tepak	56%	Poor

The findings of the needs analysis showed that students had a high degree of interest and enjoyment for the Bola Tepak game. However, differences were evident in their extent of knowledge, involvement and proficiency that need to be further strengthened. These conditions signify a need of designing a Bola Tepak game-based learning model that not only focuses on the acquirement of motor skill, but also supports meaningful, conscious and enjoyable learning experience; as well as taking account the difference in students abilities.

Desain

The design phase resulted in an initial learning model aimed not only at improving students' Bola Tepak playing skills, but also at promoting meaningful, conscious, and enjoyable learning experiences that align with the developmental characteristics of MTs students. **Table 2** presents the preliminary design of the proposed model.

Table 2. Preliminary Design of the Bola Tepak Learning Model

Model Name	Description
Single-Target Tepak Mode	Students strike a tennis ball using a tepak paddle toward a single static target, such as a cone placed at a specific distance. Trains accuracy and coordination.
Chain Cone Tepak Mode	Students strike the ball toward multiple cones arranged in sequence or in a specific pattern. Develops sequential accuracy, focus, and directional control..
Rolling Ball Tepak Model	A tennis ball is rolled from a designated direction, and students must strike it toward a target. Trains quick reactions, concentration, and whole-body coordination..
Scoring Zone Tepak Model	The playing area is divided into scoring zones (e.g., 10, 20, 30 points). Students strike the ball so that it lands in a designated scoring area. Combines striking techniques with strategy.
Team Relay Tepak Model	Students perform the task in relay groups: a player strikes the ball toward cones, retrieves the ball, returns to the line, and passes the turn to the next teammate. Trains teamwork and technical consistency.
Color-Reaction Tepak Model	Targets consist of cones of different colors. The teacher calls out a color randomly, and students must strike the ball toward the corresponding target. Enhances focus, response speed, and decision-making.
Obstacle-Course Tepak Model	Students strike the ball through a pathway containing light obstacles (zig-zag cones). Trains directional control, striking force, and trajectory accuracy..

The preliminary learning model comprised seven prototype models. These models were then evaluated for validity by three experts, namely a pedagogy expert, a subject-matter expert, and a media specialist, through an expert judgment process.

Development

The development phase was conducted to revise the initial design before devising a field-test implementation through a systematic and planned validation process. The expert validation for the current work involved a Physical Education academic expert with extensive experience in instructional devices and innovative educational methods.The assessment expert's evaluation resulted in validating: Bola Tepak game content validity with content valid in PE learning objectives, 80%; Basic Bola Tepak technique valid in model sequence, 80%; Material valid in seventh-grade students' developmental characteristics, 90%; Material clear in following game procedures valid for high-level learning experience, 80%; Game model valid in pedagogical standard of active learning, 90%. The overall mean of 84% result falls into the "Good" category.

The material expert validation yields the following results: Bola Tepak content valid in PE learning objectives, 90%; accuracy of Bola Tepak technique used in model, 80%; Material valid in seventh-grade students' developmental characteristics, 90%; Clarity of game procedure valid for high-level of learning experience, 80%; game model valid with active learning principles, 90%. The overall score obtained was 86% results in "Very Good" category.

Media Expert Test on the feasibility of the results of game media and book products, 1) Quality of graphic design 80% 2) Clarity of game motion illustrations 80% 3) Consistency of visual elements 90% 4) Readability and color contrast 80% Suitability of media with the learning char-

acteristics of MTs students 90% 5) Integration of information flow in media 80% with an average score of 83% with a good category.

The model's validity phase measure test was conducted later below **Figure 1-Figure 5.**

Figure 1. Tepak Single Target

The Single-Target Tepak Model represents a simple form of Bola Tepak gameplay, yet it demonstrates a high level of effectiveness in training students' accuracy and coordination.

Figure 2. Chain Cone Tepak Model

The Chain Cone Tepak Model is an extension of the former (Single-Target Tepak). Whereas the goal of students in model 1 is to strike the ball toward a single target, in this modified game they focus on striking a tennis ball toward multiple cones placed consecutively or randomly shaped. The cones can be set up in a straight line, zig-zag pattern or in a circle with respect to the teacher's lesson design and imagination.

Figure 3. Rolling Ball Tepak Model

The Rolling Ball Tepak Model is a Bola Tepak Spin-off that trains students to be concentrated, responsive and coordinated. Unlike the first versionexplained above, where students were striking toward a static target (cones), the second iteration now has a tennis ball rolled from one way and needs to be struck with a tepak paddle into another predetermined target.

Figure 4. Scoring Zone Tepak Model

The Scoring Zone Tepak Model is a Bola Tepak's games of variant that includes the use of striking skill with strategic scoring achievement by using an earlier marking score where the striking zone was being supply to mark, known as a target zone. The playing area includes a plurality of point zones such as 10, 20 and 30-point zones.

Figure 5. Tepak Relay Game

The Team Relay Tepak Model The team relay Tepak model is a classroom activity for group work that will focus on movement coordination, striking accuracy and teamwork as well as speed. Teams form a line and take turns hitting a tennis ball with a tepak paddle to a cone placed at distance.

Implemtation

The implementation results indicated positive feedback toward the five small-ball game models from both teachers and students. All models fell into the "Applicable" category with a high acceptance rate. Based on the question-

naire results involving 30 Grade VII students at Madrasah Tsanawiyah 1 Palembang, all models received positive responses. The average reliability percentage across the five assessed indicators ranged from 86.6% to 90%, with an overall mean of 88.1%, categorized as "Very Feasible." Among the models, the Team Relay model obtained the highest score (96%), reflecting strong student engagement in collaborative tasks and teamwork, while the Score Zone model scored slightly lower (81.8%) due to students requiring more time to adapt and understand scoring strategies. Visually, the series of learning models Single Target Tepak, Chain Cone Tepak, Rolling Ball Tepak, Score Zone Tepak, and Team Relay Tepak can be presented in one figure to illustrate their implementation sequence and activity variations. This study confirms that the five game models have high feasibility as PE learning media because they are able to create a fun, motivating learning experience, improve motor skills, and foster teamwork, so they are worthy of being an innovative learning alternative and in accordance with the characteristics of grade VII students, in line with the findings that Game-Based Learning is effective in increasing student engagement, collaboration, and motivation in the context of physical education (Shi & Shih, 2015).

Evaluation

The results of the evaluation showed that all five models received very positive responses. PE teachers assessed that all models could be implemented smoothly according to the flow of activities designed, without experiencing significant obstacles in the field (Purwanto, 2018). All five models received very positive responses. PE teachers assessed that all models could be implemented smoothly according to the flow of activities designed, without experiencing significant obstacles in the field.

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As a result of the research, the development of a learning model of the Bola Tepak game in the PE subject at Madrasah Tswanawiyah 1 Palembang succeeded in producing a model that is in accordance with the characteristics and needs of grade VII students. This research emphasizes the development of practical, structured, and applicable models, so that they can be applied directly in the learning process. The use of play-based learning has been empirically found to be suitable for the characteristics of early adolescent learners who demonstrate open-mindedness, can often be active and curious, they like practice based on experience, and need some enjoyable yet challenging activities (Hudain, 2020) (Ramli, 2025)(Abdillah, 2019)(Bile, Tapo, & Desi, 2021).

the finding of needs analysis results shows that the previous learning in Bola Tepak was so conventional and less varied, caused students' participation and involvement were uneven. Some students have trouble learning even the simplest brushstroke, are not motivated and get bored easily. These results provide an important foundation for the development of increasingly systematic, visually cohesive game models that facilitate better motor learning, comprehension of game strategy and active learner participation in games.(Mahfud & Yuliandra, 2020). The design stage resulted in seven models of the Ball game, of which five models were declared suitable for use after going through expert validation. The refined models include Single Target Tackle, Chain Cone Tackle, Rolling Football, Score Zone Tackle, and Team Relay Tackle, each of which has a different training focus, from accuracy, coordination, reaction, strategy, to teamwork.

Validation of learning, material, and media experts showed an average feasibility percentage of 83%–86%, indicating that the model is practical and applicable in PE instruction. These findings are consistent with prior development studies reporting that insufficiently structured instructional media may hinder student comprehension and thus require validated learning tools to optimize conceptual understanding and skill acquisition (Gunadi et.al, 2025).

Research shows that the Game Based Learning approach is able to encourage students to be active in every learning activity as well as improve critical thinking skills, team collaboration, and active involvement in the learning process (Fauziah et.al, 2025). These findings are in line with the partial implementation in grade VII which shows that the five models can be applied without problems, run as planned, and are easy for students to understand. Teacher observation and student feedback showed increased active participation, understanding of basic techniques, and learning motivation, with the highest re-

sponse on the Team Relay model and the lowest on the Score Zone. The average student admission of 88.1% in the "Very Feasible" category indicates high satisfaction and enthusiasm. Game-based learning is not only fun but meaningful because it engages the entire student, improves motor skills, and fosters social values such as fair play, cooperation, and collaboration. Thus, the Bola Tepak game model is declared to be theoretically and practically feasible to support PE learning at Madrasah Tsanawiyah 1 Palembang.

This research proves that the development of a game-based learning model can be an effective alternative strategy to improve the quality of PE learning(Wahyuni et.al, 2023). This model can be adopted more broadly in the learning process, as it emphasizes hands-on practice, active student engagement, and engaging use of media, while also providing valuable input for teachers for further refinement. The successful implementation of five Bola Tepak game models shows that the game-based approach is very relevant for early adolescent students and is able to be an applicative, fun, and meaningful means of learning.

CONCLUSION

The learning model of Tepak Ball in PE materials for the Madrasah Tswanawiyah 1 Palembang can be declared as feasible and valid by referring to all stages of analysis, design, development, implementation and evaluation. The development of the Bola Tepak game-based learning model for PE instruction at Madrasah Tsanawiyah 1 Palembang was carried out through a systematic process starting from needs analysis and instructional design aligned with students' characteristics, followed by prototyping, expert validation (learning/material/media), and limited field testing. The results confirmed that the model is feasible and practical, demonstrating high user acceptance and sustained student interest during implementation. As a game-based learning approach, the Bola Tepak model successfully addressed the instructional objectives by enhancing students' engagement, teamwork, and motor performance while serving as an innovative alternative for PE instruction. Thus, the developed model fulfills the research purpose and title by proving that Bola Tepak can be effectively applied in PE contexts at the Madrasah Tsanawiyah level.This model is deemed to be ready to use on a larger scale in the context of learning PE based on students fundamental technical ability power,power play,teamwork,and motivation to learn.

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