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The development of a basic underhand passing technique teaching model in volleyball for middle school students

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Abstract

The fundamental skill of underhand passing in volleyball is essential, but the lack of a teaching model for this skill has resulted in students not fully grasping the basic techniques of volleyball. This research aims to describe the feasibility, practicality, and effectiveness of a teaching model for the basic technique of underhand passing in volleyball for middle school students. The research method used is Research and Development (R&D) with the ADDIE development model. The subjects of this research are middle school students at SMP Al-Azhar Mandiri Palu in grade VIII. The small-scale trial involved 1 teacher and 15 students, while the large-scale trial involved 56 students. The research results indicated that the development of the teaching model for the basic technique of underhand passing in volleyball for middle school students is feasible, with a validity score of 90.03%, categorized as "very valid." This teaching model is also proven to be practical, with a practicality score of 88.76, categorized as "very practical." Additionally, the teaching model has been shown to be effective in enhancing the underhand passing skills of middle school students, with a Cohen's d effect size of 3.79, categorized as "large effect." This research provides a variety of exercises that are more fun and adaptive for students. This variation can increase students' learning motivation and help overcome difficulties experienced when learning basic techniques, especially for students with different physical abilities.

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INTRODUCTION

Physical Education, Sports, and Health (PJOK) is an integral part of the educational process designed to enhance physical fitness, develop motor skills, and instill knowledge and behaviors of healthy living, sportsmanship, and emotional intelligence (Jariono et al., 2020). Emphasis on carefully selected and systematically planned physical activities is aimed at achieving national education goals. Physical Education, Sports, and Health (PJOK) taught in the school environment holds a central role in providing students with opportunities to engage directly in various learning experiences through carefully chosen physical activities (Barba-Martín et al., 2020).

In the current era of globalization, where students have easy access to communication technologies such as mobile phones and personal computers, the role of PJOK has become increasingly vital to address the challenges of declining physical fitness levels due to a generally less active lifestyle. PJOK has a strategic role in developing cognitive, affective, and psychomotor aspects in school learning. This subject aims to develop not only the physical fitness but also the mental, emotional, and social health of students, as well as to establish sustainable healthy living patterns (Lubis & Agus, 2017; Suharta et al., 2022)

As a PJOK educator, a teacher is required to have the ability to adjust the learning material to the needs, situations, and characteristics of each student. Sports skills acquired through PJOK learning have a broad impact, including strengthening the body, promoting mental health, and shaping a healthy, intelligent, and creative personality in facing life's challenges (Herdiyana, 2016).

PJOK learning must be presented in an interesting and relevant manner for students, so that physical activity is integrated as part of daily life. Learning materials are structured with a gradual approach, from simple to complex, from light to heavy, and from easy to difficult, in accordance with developmental needs to enhance students' motor and coordination skills (Imran, 2019).

One of the sports that can develop students' motor skills and coordination is volleyball. Volleyball is a sport aimed at improving physical fitness as well as athletic performance. Therefore, efforts to enhance volleyball learning achievements are very important. Gery, (2023) emphasized the importance of developing learning models to achieve this goal. The developed learning model aims to encourage active participation and improve students' underhand passing skills. To achieve this goal, the learning process needs to prioritize increasing student activity and participation, as well as effectiveness and efficiency in its implementation. Additionally, the learning process must create an enjoyable atmosphere for students to make the learning process more effective and engaging for them.

Volleyball learning for junior high school students requires an in-depth review to achieve the desired learning objectives. Although teachers have delivered the material according to the PJOK curriculum, students' abilities in

volleyball movement skills still vary. Therefore, innovation in learning that aligns with the characteristics of students is needed. Innovations in the learning process are continuously carried out to improve the quality of learning and students' academic achievements. With various approaches and strategies applied, students' potential can be optimized (Lubis & Agus, 2017; Yatulkhusna et al., 2022).

In its implementation, teachers can introduce materials regarding large ball games as an effort to develop skills and increase students' interest in physical activities. Thus, besides achieving learning objectives, the need for movement is also fulfilled, and directly, students' motor skills can be improved. The selection of interesting learning models and the inclusion of movement variations will attract students' interest in the learning process. Besides enhancing skills, such learning also ensures that learning objectives are achieved and the need for physical activity is met (Astuti et al., 2022). In this context, the addition of fun games can increase students' enthusiasm, reduce fatigue, and improve their physical fitness (Atsani, 2020). Therefore, the development of training models in learning must be creative, effective, and efficient, including through the modification of games and the addition of movement variations, so that students are not only actively and enthusiastically involved in learning but also can improve their skills and physical fitness.

This research will be focused on volleyball learning, with a special emphasis on improving underhand passing skills. In volleyball learning, students' underhand passing skills are still not optimal, and often students feel bored, so the learning objectives are not fully achieved (Azizah et al., 2022; Budiarti et al., 2019). Volleyball learning is still dominated by command methods, where students are instructed to perform underhand passing movements after receiving the ball (Endriani et al., 2022; Prasetyo et al., 2022). Such monotonous teaching techniques have not been able to optimally stimulate students' interest, so a more varied and interesting approach is needed to enhance students' skills and interest in this learning.

From the observations conducted by the researcher at SMP Al-Azhar Mandiri Palu, several problems related to Physical Education, Sports, and Health (PJOK) learning were revealed. The first problem is related to the learning of Basic Volleyball Techniques for junior high school students, where teachers have not found an effective approach to teach it to eighth-grade students. Field observations and initial observations show that the teaching of Basic Volleyball Techniques is still lacking in variety. Teachers tend to only train students in a simple manner, often involving basic volleyball game exercises in pairs. However, this method is not always effective, and a learning approach that introduces game elements may be a more effective solution (Fitriani, 2021; Karisman & Supriadi, 2022).

The second problem is related to the inefficient use of teaching materials and learning time, where the 2x40 minute period is often not utilized optimally due

to interruptions before and after learning. In terms of teaching materials, teachers do not provide comprehensive materials on volleyball games, so students lack references in developing their skills in volleyball learning.

The third problem relates to the lack of basic skills in volleyball, which affects the overall quality of the game. Underhand passing skills in volleyball are still considered insufficiently varied in their teaching to junior high school students. The factors causing the low skill levels need to be traced, whether related to poor technical understanding, lack of physical support, or ineffective training methods.

The fourth problem is related to the lack of variety in learning models, which causes boredom and reluctance among students to participate in learning. This is especially evident in students who are less interested in sports, while students who have more interest in sports always want to participate. As a result, not all students are active in learning, which is certainly not beneficial for a harmonious learning atmosphere. A comprehensive evaluation of these factors needs to be conducted by PJOK teachers to develop more effective learning models in improving volleyball skills and students' interest.

Various problems are often encountered in school environments, with each school facing different challenges. Therefore, the researcher aims to develop a learning model focused on underhand passing in volleyball. Field situations show that Physical Education, Sports, and Health (PJOK) learning has not achieved the expected level of success, primarily due to the mismatch between the delivered learning materials and the needs of junior high school students, as well as the need for greater effectiveness and efficiency from teachers to achieve the desired goals. Therefore, an in-depth study of the appropriate learning models and methods, especially related to underhand passing in volleyball, becomes very important. Through this research, it is hoped that appropriate solutions for teaching these techniques to junior high school students will be found.

Therefore, the development of a training model in learning aims to make volleyball learning materials more interesting and easily understood by students, as well as to improve their underhand passing skills. The training model is packaged in the form of teaching materials in the form of a module. The teaching materials contain various information and illustrations of volleyball games, making it easier for students to understand the basic techniques in volleyball games. The results of this study are expected to bring significant changes in volleyball learning, with the aim of encouraging active participation and generating students' interest, as well as achieving learning objectives effectively. It is hoped that the development of this training model will also provide positive benefits for students in other learning areas (Ajayati, 2017).

Based on this background, the problem faced is the limited underhand passing skills of students in volleyball learning, due to the lack of variety in the materials and lack of modifications in

learning. Students also experience difficulties in performing underhand passing movements. Therefore, the development of a training model in volleyball learning is necessary to improve students' skills in this area, so that volleyball learning can achieve optimal results and achieve learning objectives. It is important for PJOK subjects to create various modifications in volleyball learning to attract students' interest, encourage more active physical activity, and especially to improve students' underhand passing skills in volleyball learning at school. The objectives of this research are to describe the feasibility, practicality, and effectiveness of the learning model for underhand passing techniques in volleyball games for junior high school students.

METHODS

This research is a developmental study that uses the ADDIE development model, which consists of five stages: analysis, design, development, implementation, and evaluation. The research stages were conducted according to the ADDIE development model (Branch, 2009).

Procedures

The initial stage is analysis, where user needs and material content are analyzed for product development purposes. The second stage is design, where the model is arranged and the product display is created. The next stage is development, where the product is validated by subject matter experts, media experts, and teachers. The fourth stage is implementation, where the product is applied to small and large groups. During this stage, practicality and effectiveness tests on underhand passing skills are conducted using the experimental design One Group Pretest-Posttest Design. The final stage is evaluation, where formative and summative evaluations are conducted. The summative evaluation is performed by analyzing the results of the student response questionnaires.

Sampling Procedures

The research was conducted at SMP Al-Azhar Mandiri Palu, with samples selected based on simple random sampling, taking 15 eighth-grade students for the small group and 60 eighth-grade students for the large group trial.

Materials and Apparatus

Research data were collected through questionnaires (expert validation questionnaires and student response questionnaires), interview guides for students and teachers, and the Brumbach Forearm Pass Wall-Volley Test to measure underhand passing skills.

Design or Data Analysis

The collected data were then analyzed using validity, practicality, and effectiveness data analysis techniques. The validity analysis was performed by calculating the assessments from expert validators, and the obtained results were interpreted based on the validity categories presented in Table 1. The practicality analysis was conducted by

calculating the assessments from observers, and the obtained results were interpreted based on the practicality categories presented in Table 1. The effectiveness analysis of students' underhand passing skills was performed by testing the effectiveness of product implementation using a difference test and Effect Size data analysis. The obtained effect size values were then interpreted using Cohen's criteria shown in Table 1.

Table 1. Interpretation Score

Type Of Analysis	Score	Category
Validity	85 – 100 %	Very Valid
	70 – 85 %	Valid
	55 – 70 %	Fairly Valid
	35 – 55 %	Less Valid
	20 – 35 %	invalid
Practicality	81 – 100 %	Very Practical
	61 – 80 %	Practical
	41 – 60 %	Fairly Practical
	21 – 40 %	Less Practical
	0 – 20 %	Not Practical
Effectiveness	> 0,80	Huge Effect
	0,5 – 0,80	Great Effect
	0,20 – 0,50	Medium Effect
	0 – 0,20	Little Effect

RESULT

The results of the subject matter expert validation are presented in Table 2.

Table 2. Subject Matter Expert Validation Results

Aspect	Percentage (%)	Category
The truth of Volleyball Concepts	93,75	Very Valid
The truth of the material	100	Very Valid
The implementation of learning	87,5	Very Valid

Based on Table 2, the validation scores from the subject matter experts indicate that the developed product is deemed highly valid for use. Next, the media expert validation results are presented in Table 3.

Table 3. Media Expert Validation Results

Aspect	Percentage (%)	Category
Physical Appearance of the Module	87,5	Very Valid
The writing and organization of the module	75	Valid
The clarity of sentences and readability level	91,67	Very Valid

Based on Table 3, the validation scores from the media experts indicate that

the developed product is deemed highly valid for use. Following this, the volleyball expert validation results are presented in Table 4.

Table 4. Volleyball Expert Validation Results

Aspect	Percentage (%)	Category
Suitability with Basic Volleyball Techniques	100	Very Valid
The sequence of the game in training the basic underhand passing technique	75	Valid
The suitability of the learning model for the students' age	75	Valid
The clarity of game instructions was accurate	75	Valid
The suitability of the equipment used with the students' abilities in practicing the volleyball learning model	100	Very Valid
The suitability of the game steps can minimize the occurrence of injuries	100	Very Valid
Encouraging students to be active in carrying out the volleyball learning model	100	Very Valid
Encouraging the development of cognitive, affective, and psychomotor aspects of students	100	Very Valid

Based on Table 4, the validation scores from the volleyball experts indicate that the developed product is deemed highly valid for use. Based on the data from the three tables above, the product developed has been rated highly valid by all three experts with a validity score of 90.03%. Next, the practicality results of the product, as assessed by teachers, are presented in Table 5.

Table 5. Teacher Assessment Results

Aspect	Percentage (%)	Category
The guide for learning the underhand passing technique is very contextual	77,38	Pratical
The design is attractive	91,67	Very Pratical
The writing and images are clear	97,22	Very Pratical
Conclusion	88,76	Very Pratical

The teachers' assessment of the volleyball learning model product for improving underhand passing skills in junior high school students during the small-scale trial was 88.76%. Based on this assessment, the product was rated "very practical". Following this, the effectiveness of the product on students' underhand passing skills was evaluated. The effectiveness analysis results are presented in Tables 6 and 7.

Based on Table 6, with a significance level (sig) of < 0.001, it can be concluded that there is a difference in the underhand passing skills of junior high school students between the pretest and posttest.

Table 6. T-Test Results

Group	N	Mean	t	sig
Pre-Test	56	15,04	-19,148	< 0,001
Post-Test	56	24,73		

Table 7. Effect Size Test Results

Description	Results
N	56
Mean Pretest	15,04
Mean Posttest	24,73
Cohen's D	**3,79**
Interpretation	**Huge Effet**

Based on Table 7, the average Cohen's d effect size score of 3.79 falls within the criteria of a very large effect (d > 0.80). Based on these results, it can be concluded that the students' underhand passing skills showed an "improvement" after participating in volleyball learning according to the developed product.

DISCUSSION

This research utilized the ADDIE model for development. The first stage in this research was the analysis stage. During the analysis stage, the primary activity conducted was analyzing the need for developing a practical volleyball learning model to enhance underhand passing skills for junior high school students. Literature review and field studies were conducted to identify the problems faced in volleyball learning. Initial observations indicated that many students experienced difficulties in mastering the underhand passing technique. This needs analysis aimed to determine the requirements and feasibility of the product to be developed and provide solutions to address these issues.

The design stage focused on creating a development plan for the learning model based on the needs analysis results. The structure and content of the volleyball learning model, including the teaching techniques and strategies to be used, were designed. This design included the preparation of learning materials, teaching aids, and evaluation methods to be implemented. During this stage, instruments for assessing the effectiveness of the learning model, such as expert validation questionnaires and teacher and student response questionnaires, were also prepared.

In the development stage, the designed learning model was validated by experts to assess its quality and feasibility. The validation results indicated that the model was categorized as "Highly Valid" and suitable for trial. After receiving feedback and suggestions from the experts, revisions were made to the learning model before proceeding to the implementation stage. The revised product was expected to provide practical and effective solutions to improve the underhand passing skills of junior high school students.

The implementation stage involved product trials on a small and large scale. The small-scale trial was conducted to evaluate the practicality of the learning model, while the large-scale trial measured

its effectiveness. During this stage, pretests and posttests were conducted to determine the improvement in underhand passing skills after using the developed learning model. The results of the Paired Sample T-Test showed a significant difference between the pretest and posttest scores, with a sig value < 0.001. Additionally, the effect size test using Cohen's d value indicated that the improvement in underhand passing skills was in the "very large effect" category, with a value of 3.79.

The evaluation was conducted in two forms: formative and summative evaluation. Formative evaluation was carried out at each stage from analysis to implementation to detect and correct minor errors in the product. Summative evaluation was conducted by gathering feedback from students and teachers. The analysis of the questionnaires indicated that the learning model was very practical and effective in enhancing the underhand passing skills of junior high school students. Based on these evaluation results, it can be concluded that the developed learning model successfully achieved the research objectives and can be used as an alternative in volleyball learning in schools.

Based on the analysis results, it can be concluded that the developed volleyball learning model for improving underhand passing skills of junior high school students is "feasible" to be used as a guide for volleyball learning. The effectiveness test showed that there was a "very large effect" on the students' underhand passing skills after using the developed volleyball learning model. This indicates that the development of the volleyball learning model can improve the underhand passing skills of junior high school students and is "effective" for use in volleyball learning.

This finding is supported by the research results of Destriana et al., (2018), which showed that the development of an underhand passing learning model in volleyball learning for junior high school students is feasible and effective for use in learning. Herdiyana, (2016) also showed that the development of the CERIA (Careful, Creative, and Active) learning model effectively improved passing skills in volleyball for junior high school students. The results demonstrated significant achievements from the volleyball passing model through a game-based approach, indicating that the volleyball passing model can be used for volleyball learning to enhance underhand and overhand passing skills (Karisman & Supriadi, 2022).

Further research indicated that a learning model for 11-12-year-old students could be developed and applied in volleyball learning in primary schools. The learning model for 11-12-year-old graduates can positively contribute to the achievement of primary school sports goals by not only enhancing underhand passing skills in volleyball but also motivating students to learn various things (Fitriani, 2021). Rohendi, (2022) stated that based on the calculation of the confirmation index, a confirmation class test score of 0.705 was obtained, indicating a high class. In other words, students' abilities improved after learning the underhand volleyball passing (AfR model), and based on monitoring and

evaluation results, this model is highly suitable and feasible for implementation at the school level.

Based on the study by Azizah et al., (2022), it was found through the calculation of the first hypothesis test that the practice of underhand passing using a target wall with a rope had an effect on the underhand passing ability. The calculation of the second hypothesis revealed that the practice of underhand passing using a target wall with a circle also had an effect on the underhand passing ability. The comparison of the means indicated that underhand passing practice using a circular target was better than using a rope target for underhand passing in volleyball. The comparison of these two training methods concluded that underhand passing practice using a target wall with a circle produced better results compared to using a rope target for the underhand passing ability of students in volleyball.

Destriana et al., (2020) showed that the application of underhand passing development techniques can improve volleyball learning outcomes. The findings from this research indicated the creation of a teaching technique in volleyball that can enhance learning outcomes in the game. Research on efforts to improve learning outcomes in basic underhand passing techniques using the drill method was evidenced by the observation of student learning outcomes. Initially, only 1 out of 11 students achieved the minimum competency score (KKM) of 70, which increased to 6 students in the first cycle and further to 11 students in the second cycle, all achieving a score of 70 or higher.

Yatulkhusna et al., (2022) also showed that the development of an underhand passing learning model for eighth-grade students was valid, with a material development validity of 98% and a linguistic validity of 96%, indicating the effectiveness of the developed volleyball learning model. The reliability was high, with a small group test confidence level of 0.988 and a large group test confidence level of 0.996. Overall, it can be concluded that the development of an underhand passing learning model for eighth-grade students is highly beneficial for more effective passing instruction.

Based on the above opinions, it can be concluded that the developed and modified volleyball learning model, using various methods and models, can improve students' skills in volleyball learning. This is evidenced by the research conducted and proved to be effective, particularly for volleyball instruction in schools.

According to Aini et al., (2020) a person is considered highly skilled when they move efficiently and effectively, or when they appear to have a good chance of performing a particular movement. A person's ability, as reflected in their capacity to perform specific motor tasks, can be identified by the quality of their ability to perform certain tasks with a certain degree of success. New skills can be acquired or mastered if learned or practiced consistently over a period of time. Motor skills, based on genetic and environmental factors, are divided into two parts: a) Phylogenetic skills are innate skills present in a child from birth and can develop with age. b) Ontogenetic skills are skills that emerge through practice and

experience due to environmental influences. In principle, a skill can only be mastered or acquired if learned under certain conditions, one of which is that learning or practice activities must be carried out continuously over a period of time (Switri & Yusfi, 2020; Tariki et al., 2023).

Several limitations were identified in this research. The population and sample were limited to junior high school students at SMP Al-Azhar Mandiri Palu, which may not reflect the diversity of students in other schools, potentially affecting the generalizability of the results. Logistical and resource constraints also limited the expansion of the study to other schools. Additionally, ensuring the sincerity of respondents during the activities was challenging, as students completed questionnaires and conducted activities independently, possibly affecting the accuracy of the data. Full monitoring and control during the implementation were not feasible, posing challenges in ensuring correct adherence to instructions and proper application of the developed learning model. These factors could impact the validity and reliability of the research findings.

Research and development of volleyball learning models aimed at improving the underhand and overhead passing skills of junior high school students have several important implications. First, the development of this volleyball learning model significantly enhances the students' underhand and overhead passing skills. This learning model has been specifically designed to effectively sharpen passing techniques, allowing students to master the basic skills required in volleyball. This not only improves their technical abilities but also builds their confidence and resilience in real game situations (Destriani et al., 2022).

Furthermore, this volleyball learning model can be used as a routine practice for students and as a valuable teaching material for physical education teachers. With a systematic and directed training structure, teachers can easily integrate this model into their teaching curriculum. The model provides various exercises that can be performed individually or in groups, helping students improve their skills through repeated practice and periodic evaluations.

Additionally, the research and development have made students more active in conducting volleyball learning to improve their underhand and overhead passing skills. The activities designed in this model emphasize active participation and collaboration among students, making learning more interactive and engaging. Students are encouraged to work together in teams, provide feedback to each other, and continuously improve their techniques. This not only enhances their technical skills but also develops important social and teamwork skills.

Many positive responses have been received from teachers and students regarding the development of this volleyball learning model. Teachers reported that this model makes it easier for them to teach passing techniques and makes the learning process more enjoyable. Students also feel more motivated and enthusiastic about

participating in volleyball lessons. The developed model demonstrates that volleyball learning plays a crucial role in enhancing the underhand passing skills of junior high school students. The implications of this research indicate that a systematic and structured approach in sports teaching can yield significant results in improving students' skills.

CONCLUSION

The development of a volleyball learning model product to improve underhand passing skills for junior high school students was proven to be feasible with a score of 90.03% in the "Very Valid" category. The volleyball learning model development was proven practical to be used as a volleyball learning model with a practicality score of 88.76% in the "Very Practical" category. The development of the volleyball learning model to enhance the underhand passing skills of junior high school students was proven effective, with an effect size test yielding a Cohen's d value of 3.79, which falls into the "Large Effect" category.

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