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Development of A Teaching Module on The Overhand Volleyball Serve Technique to Improve Elementary School Students' Learning Outcome

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ABSTRACT

This study aimed to develop a teaching module for the volleyball overhead serve technique to improve elementary school students' learning outcomes. The study employed a Research and Development (R&D) approach using the ADDIE model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. The research was conducted at SD Negeri 175803 Tampahan with fourth-grade students as the research subjects. Data were collected through observations, interviews, validation sheets, questionnaires, and learning outcome tests. The developed teaching module was validated by material experts and media experts to determine its feasibility. The validation results showed that the module obtained a score of 92.25% from material experts and 92.25% from media experts, both categorized as very valid. The practicality test results showed a score of 95.00% from teachers and 92.50% from students, indicating that the module was very practical for use in learning activities. Furthermore, the effectiveness test revealed that 22 out of 25 students achieved mastery learning, resulting in a classical completeness percentage of 88%, which met the effectiveness criteria. These findings indicate that the volleyball overhead serve teaching module developed through the ADDIE model is valid, practical, and effective for improving elementary school students' learning outcomes. Therefore, the module can be utilized as an alternative learning resource in Physical Education, Sports, and Health (PJOK) learning, particularly for teaching volleyball overhead serve techniques.

Keywords: Teaching Module, Overhead Serve, Volleyball, Learning Outcomes, Elementary School
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INTRODUCTION

Physical Education, Sports, and Health (PJOK) is one of the subjects that plays a significant role in developing students' physical abilities, motor skills, knowledge, attitudes, and character. Through PJOK learning, students are expected to enhance their physical fitness, motor competencies, critical thinking skills, and values such as sportsmanship, discipline, cooperation, and responsibility. In the implementation of the Merdeka Curriculum, PJOK learning is directed toward student-centered learning; therefore, appropriate learning tools are required to support the achievement of learning objectives optimally.

One of the materials taught in PJOK learning at the elementary school level is volleyball. Volleyball is a team sport that requires mastery of various fundamental techniques, including underhand passing, overhead passing, underhand serving, overhand serving, spiking, and blocking. Among these techniques, the overhand serve is one of the most important

fundamental skills because it initiates the game and can be strategically used to score points. Therefore, instruction on the overhand serving technique should be systematically designed to enable students to understand and perform the movements correctly.

According to Depari (2025), the development of teaching modules has become an essential component of the learning process because it assists teachers in presenting instructional materials in a more systematic, organized, and student-oriented manner. Well-designed teaching modules facilitate independent learning, enhance students' understanding of learning materials, and support the effective achievement of learning objectives. Furthermore, teaching modules can assist teachers in implementing more innovative and student-centered learning practices.

In line with this view, Wardani et al. (2025) stated that the use of systematically designed teaching modules can improve students' learning motivation, engagement in the learning process, and overall learning outcomes. Teaching modules that incorporate learning objectives, instructional materials, learning activities, exercises, and assessments in a structured manner provide more meaningful learning experiences for students.

However, preliminary observations conducted by the researchers revealed that the teaching of the volleyball overhand serve technique in elementary schools still faces several challenges. Many students experience difficulties in understanding the correct sequence of overhand serving movements, including the initial stance, movement execution, and follow-through phase. Students frequently make errors in striking the ball, coordinating body movements, and directing the ball toward the intended target. These conditions contribute to relatively low learning outcomes in the volleyball overhand serve material.

Moreover, the ongoing learning process remains predominantly centered on teacher demonstrations and verbal explanations. The instructional materials used in learning activities are still limited, resulting in students having insufficient opportunities to review and study the material independently. Consequently, students tend to rely heavily on teacher explanations and encounter difficulties when revisiting the material outside classroom hours.

According to Nuryadi et al. (2024), one of the factors influencing the successful implementation of the Merdeka Curriculum is the availability of teaching modules that align with students' characteristics and learning outcomes. Well-designed teaching modules can assistan teachers in implementing learning activities in a more structured manner while providing students with more effective learning experiences. Therefore, the development of teaching modules represents a viable solution to address various challenges encountered in the

learning process. Based on these issues, there is a need for instructional materials that can help students understand the volleyball overhand serve technique more easily and systematically. The developed teaching module is expected to provide clear guidance regarding the stages of performing the overhand serve, offer engaging learning activities, and facilitate independent learning. As a result, students will be better able to understand both the concepts and practical execution of the volleyball overhand serve technique, leading to improved learning outcomes. Research focusing on the development of teaching modules for volleyball overhand serving techniques remains relatively limited, particularly at the elementary school level. Most previous studies have concentrated on developing instructional materials for general subjects or broader PJOK learning contexts. Therefore, the novelty of this study lies in the development of a teaching module specifically designed for teaching the volleyball overhand serve technique to elementary school students.

Based on the foregoing discussion, this study aims to develop a teaching module for the volleyball overhand serve technique that is valid, practical, and effective in improving elementary school students' learning outcomes. The resulting teaching module is expected to serve as a valuable learning resource that supports the PJOK learning process, assists teachers in delivering instructional materials systematically, and enhances students' understanding and skills in performing the volleyball overhand serve technique.

METHODS

This study employed a Research and Development (R&D) approach aimed at producing a teaching module on the volleyball overhand serve technique for elementary school students that is valid, practical, and effective in improving students' learning outcomes. The development model used in this study was the ADDIE model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. The ADDIE model was selected because it provides systematic procedures that are appropriate for the development of instructional materials in educational settings.

The study was conducted at SD Negeri 175803 Tampahan. The research participants consisted of subject matter experts, media experts, Physical Education, Sports, and Health (PJOK) teachers, and fourth-grade elementary school students. The subject matter experts and media experts were responsible for evaluating the feasibility of the developed product, while teachers and students participated in the practicality and effectiveness testing of the teaching module.

The development of the volleyball overhand serve teaching module followed the stages of the ADDIE model as described below.

Analysis

The analysis stage was conducted to identify learning needs, student characteristics, learning outcomes, and problems encountered in teaching the volleyball overhand serve technique. Data were collected through classroom observations, interviews with PJOK teachers, and document analysis of instructional materials currently used in the school.

Design

At this stage, the teaching module was designed by formulating learning objectives, instructional materials, learning activities, assessments, exercises, and module layout. The module was developed in accordance with the principles of the Merdeka Curriculum and the characteristics of elementary school students.

Development

During the development stage, the teaching module was created based on the previously established design. The module was subsequently validated by subject matter experts and media experts to determine its feasibility. Feedback and suggestions provided by the validators were used as the basis for revising the product before field implementation.

Implementation

The revised teaching module was then implemented with fourth-grade elementary school students. This stage aimed to determine the practicality and effectiveness of the module in teaching the volleyball overhand serve technique.

Evaluation

The evaluation stage was conducted to assess the overall development process and the quality of the final product. Evaluation was based on expert validation results, teacher and student responses, and students' learning outcomes after using the teaching module.

The instruments used in this study included:

These instruments were used to obtain data regarding the feasibility of the teaching module in terms of content, language, presentation, and visual design.

This questionnaire was used to determine the practicality of the teaching module based on the evaluations provided by PJOK teachers.

This instrument was used to gather students' perceptions regarding the ease of use, attractiveness, and usefulness of the teaching module.

The learning achievement test was used to measure students' improvement in learning outcomes after using the volleyball overhand serve teaching module.

Data were collected using the following techniques:

Observation, to identify learning conditions and students' learning needs.

Interviews, to obtain information from PJOK teachers regarding instructional challenges.

Questionnaires, to collect data related to the validity and practicality of the teaching module.

Tests, to measure students' learning outcomes following the implementation of the teaching module.

The collected data were analyzed using descriptive quantitative analysis.

The validity level of the teaching module was calculated using the following formula:

$$P = \frac{\sum X}{\sum X_i} \times 100\%$$

Where:

- P = validity percentage;
- ΣX = total score obtained from the validators;
- ΣXi = maximum possible score.

The validity percentage was used to determine the feasibility level of the developed teaching module. The higher the percentage obtained, the higher the validity level of the product. The validity criteria were classified according to the predetermined assessment standards.

Table 1. Validity Criteria

Percentage (%)	Criteria
81–100	Very Valid
61–80	Valid
41–60	Fairly Valid
21–40	Less Valid
0–20	Invalid

The validity percentage obtained from expert evaluations was interpreted using the criteria presented in Table 1. A teaching module is considered feasible for implementation if it achieves a validity level within the valid or very valid category. Products categorized as fairly valid, less valid, or invalid require revision before being implemented in the learning process.

The practicality level of the teaching module was calculated using the following formula:

$$P = \frac{\sum X}{\sum X_i} \times 100\%$$

Table 2. Practicality Criteria

Percentage (%)	Criteria
81–100	Very Practical
61–80	Practical
41–60	Fairly Practical
21–40	Less Practical
0–20	Impractical

The practicality level of the teaching module was interpreted based on the criteria presented in Table 2. A teaching module is categorized as very practical if it obtains a score between 81% and 100%, practical if it obtains a score between 61% and 80%, fairly practical if it obtains a score between 41% and 60%, less practical if it obtains a score between 21% and 40%, and impractical if it obtains a score between 0% and 20%. The module is considered suitable for classroom implementation when it achieves at least the practical category.

The effectiveness of the teaching module was determined based on students' learning

$$P = \frac{n}{N} \times 100\%$$

mastery after participating in the learning process using the developed teaching module. The effectiveness level was calculated using the following formula:

Where:

- (P) = percentage of learning mastery;
- (n) = number of students who achieved mastery learning;
- (N) = total number of students.

The effectiveness of the teaching module was determined based on students' learning mastery. The module was considered effective if at least 80% of the students achieved the Minimum Learning Achievement Criteria (KKTP) established by the school. The percentage of learning mastery was used to evaluate the extent to which the developed teaching module contributed to improving students' learning outcomes in the volleyball overhand serve technique.

A higher percentage of learning mastery indicates a greater level of effectiveness of the teaching module in supporting the achievement of the intended learning objectives.

RESULTS AND DISCUSSION

Result

The teaching module was validated by subject matter experts and media experts to determine the feasibility of the developed product before its implementation in the learning process. The subject matter expert evaluation covered aspects such as content relevance, conceptual accuracy, material presentation, and alignment with the learning objectives. Meanwhile, the media expert evaluation focused on visual appearance, layout design, readability, and ease of use of the teaching module. Based on the validation results presented in Figure 1, both the subject matter expert and media expert evaluations yielded a validity percentage of 92.25%. These findings indicate that the volleyball overhand serve teaching module falls within the very valid category. The high validity score demonstrates that the content presented in the module is aligned with the intended learning outcomes, the characteristics of elementary school students, and the principles of effective teaching module development.

The results suggest that the developed teaching module has met the requirements for content quality and instructional design. The module provides systematic learning materials, clear learning activities, and appropriate assessment components that support students in understanding and practicing the volleyball overhand serve technique. Furthermore, the attractive visual design and user-friendly layout contribute to the overall quality of the module, making it suitable for use in elementary school physical education learning. These findings are consistent with previous studies indicating that well-designed teaching modules can improve the quality of the learning process by providing structured instructional guidance and facilitating independent learning. The high validity score obtained in this study confirms that the developed module is feasible for implementation and can serve as an effective learning resource for both teachers and students in Physical Education, Sports, and Health (PJOK) learning activities.

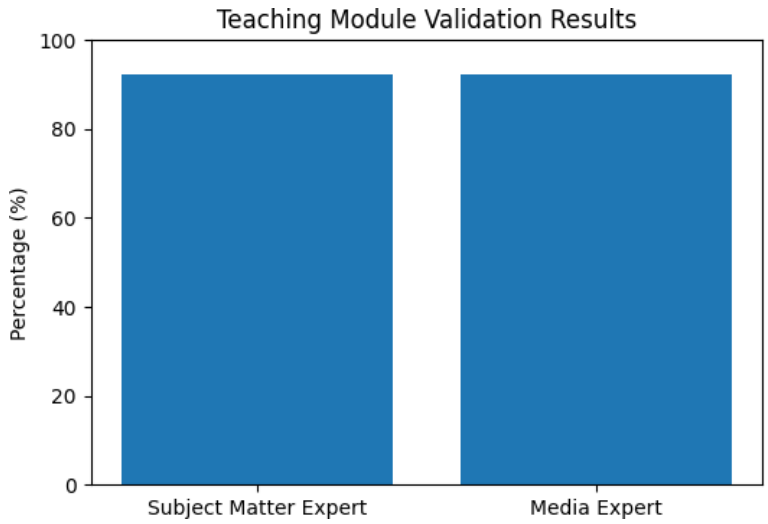


Figure 1. Validation Results of the Teaching Module

These validation results indicate that the teaching module is feasible for use in the learning process after revisions were made based on the suggestions and feedback provided by the validators. The revisions contributed to improving both the content quality and the overall design of the module, ensuring that it meets the expected educational standards. Therefore, the developed teaching module fulfilled the requirements related to content validity, language appropriateness, presentation quality, and graphical design. As a result, the module was considered suitable for implementation in elementary school Physical Education, Sports, and Health (PJOK) learning, particularly in teaching the volleyball overhand serve technique.

Teaching Module Practicality Results

The practicality of the teaching module was assessed based on the responses of teachers and students after using the module in the learning process. The teacher evaluation covered aspects such as ease of use, clarity of instructions, content suitability, and the usefulness of the module. Meanwhile, the student evaluation focused on the ease of understanding the learning materials, visual attractiveness, learning motivation, and ease of use of the module. As presented in Figure 2, the teacher response yielded a practicality percentage of 95.00%, while the student response yielded a practicality percentage of 92.50%. Both results fall within the very practical category. These findings indicate that the developed teaching module is easy to use and well accepted by both teachers and students. The high practicality score obtained from the teacher responses suggests that the module provides clear guidance, relevant learning materials, and effective learning activities that support the teaching process. Similarly, the high

practicality score obtained from the student responses indicates that the module is attractive, understandable, and capable of enhancing students' engagement in learning activities.

The results demonstrate that the teaching module can facilitate the learning process by providing structured instructional materials and learning activities that are appropriate for elementary school students. Furthermore, the attractive design and user-friendly format of the module contribute to increasing students' motivation and participation during the learning process. Therefore, the developed volleyball overhand serve teaching module can be considered highly practical and suitable for implementation in Physical Education, Sports, and Health (PJOK) learning at the elementary school level.

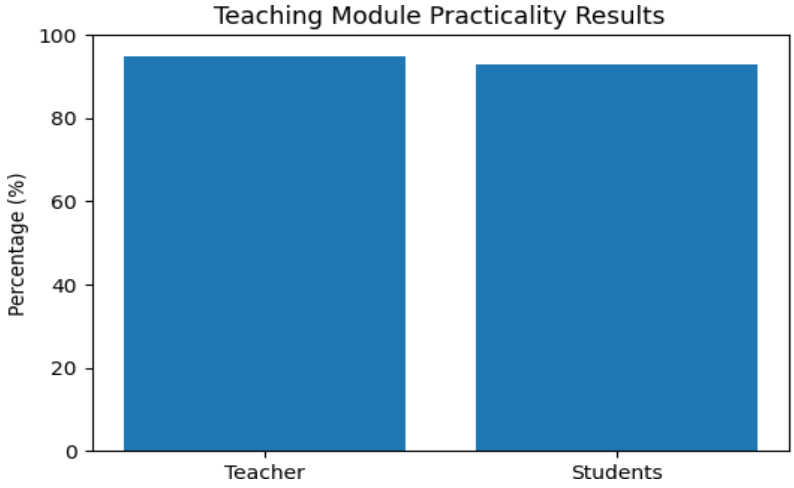


Figure 2. Teaching Module Practicality Results

The high practicality scores indicate that the teaching module is easy to use for both teachers and students. Teachers reported that the module facilitated a more structured and systematic delivery of learning materials, enabling them to organize instructional activities more effectively. Meanwhile, students found it easier to understand the volleyball overhand serve technique because the content was presented in a clear and sequential manner and was supported by illustrative images that enhanced comprehension. In addition, the attractive visual design of the module contributed positively to students' learning motivation and engagement during the instructional process. These findings suggest that the developed teaching module not only supports teachers in managing learning activities but also provides students with a more meaningful and enjoyable learning experience. Consequently, the module has strong potential to improve the effectiveness of Physical Education, Sports, and Health (PJOK) learning, particularly in mastering the volleyball overhand serve technique.

Teaching Module Effectiveness Results

The effectiveness of the teaching module was evaluated based on students' learning mastery after participating in learning activities using the volleyball overhand serve teaching module. Learning mastery was determined according to the achievement of scores that met the Minimum Learning Achievement Criteria (KKTP) established by the school. Based on the evaluation results presented in Figure 3, out of a total of 25 students, 22 students achieved learning mastery, while 3 students did not achieve learning mastery. These results indicate that the classical learning mastery percentage reached 88%. The findings demonstrate that the developed teaching module was effective in improving students' learning outcomes in the volleyball overhand serve technique. Since the percentage of students achieving learning mastery exceeded the minimum effectiveness criterion of 80%, the module can be categorized as effective. The high level of learning mastery suggests that the module successfully facilitated students' understanding of the concepts and practical skills related to the volleyball overhand serve technique.

Furthermore, the effectiveness of the module may be attributed to its systematic presentation of learning materials, clear instructional guidance, engaging learning activities, and supporting illustrations that enhanced students' comprehension. These features enabled students to learn more independently and actively participate in the learning process. Therefore, the developed teaching module can be considered an effective instructional resource for improving elementary school students' learning outcomes in Physical Education, Sports, and Health (PJOK), particularly in mastering the volleyball overhand serve technique.

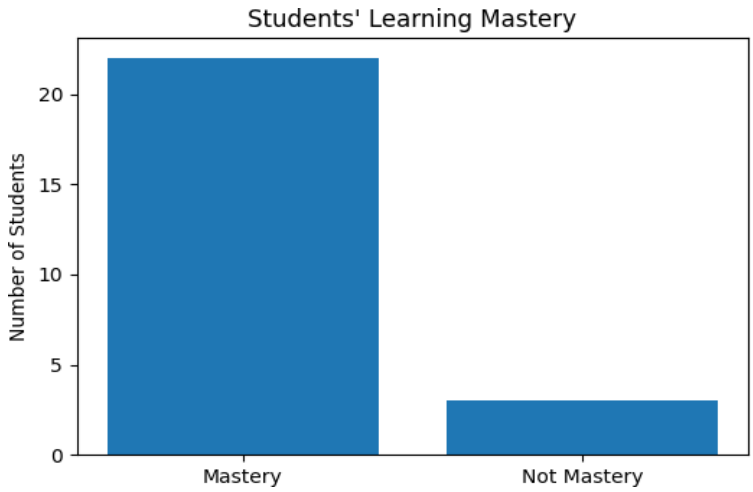


Figure 3. Effectiveness Results of the Volleyball Overhand Serve Teaching Module Based on Students' Learning Mastery.

The learning mastery percentage of 88% indicates that the developed teaching module falls within the effective category. This finding suggests that the use of the teaching module was successful in helping students better understand the concepts and techniques of the volleyball overhand serve. The module provided students with clear instructional guidance and learning materials that facilitated the acquisition of both theoretical knowledge and practical skills. The effectiveness of the module can be attributed to its systematic presentation of learning content, structured practice activities, and detailed movement illustrations. These features enabled students to follow the learning process more easily and develop a deeper understanding of the correct execution of the volleyball overhand serve technique. Furthermore, the integration of visual supports and sequential learning activities contributed to creating a more meaningful and engaging learning experience. As a result, students were able to actively participate in the learning process and demonstrate improved learning outcomes. These findings indicate that the developed teaching module not only supports students' comprehension of learning materials but also enhances their practical performance in Physical Education, Sports, and Health (PJOK) learning. Therefore, the

module has considerable potential to be used as an effective instructional resource for improving elementary school students' mastery of volleyball skills.

Discussion

The findings of this study revealed that the developed volleyball overhand serve teaching module met the criteria of validity, practicality, and effectiveness. Based on the validation results, the teaching module achieved an average score of 92.25% from both the subject matter expert and the media expert, which falls within the very valid category. This finding indicates that the module is well aligned with learning needs, the characteristics of elementary school students, and the intended learning outcomes. According to Depari (2025), teaching modules developed based on students' needs can improve the quality of instruction and facilitate students' understanding of learning materials.

From the practicality perspective, the teacher response score of 95.00% and the student response score of 92.50% indicate that the teaching module is highly practical for classroom implementation. The ease of use, clarity of instructions, and attractive presentation of learning materials were identified as the primary factors contributing to the high level of practicality. These findings are consistent with those reported by Wardani et al. (2025), who stated that systematically designed teaching modules can increase student engagement and assist teachers in implementing more effective learning activities.

Furthermore, the effectiveness results demonstrated that 88% of the students achieved learning mastery after using the developed teaching module. This percentage exceeded the predetermined criterion for classical learning mastery, indicating that the module was effective in improving students' learning outcomes. The improvement in learning achievement can be attributed to the opportunities provided for students to study independently through the module, understand the stages of the volleyball overhand serve technique progressively, and engage in structured practice activities guided by the instructions provided in the module.

Overall, the findings confirm that the developed volleyball overhand serve teaching module can serve as a solution to the limited availability of instructional materials in Physical Education, Sports, and Health (PJOK) learning at the elementary school level. The module not only assists teachers in managing learning activities in a more systematic manner but also helps students improve their understanding and performance of the volleyball overhand serve technique. Therefore, the developed teaching module is considered appropriate for use as a learning resource in elementary school PJOK instruction.

CONCLUSION

Based on the results of the research and development process, it can be concluded that the volleyball overhand serve teaching module developed using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) fulfilled the criteria of validity, practicality, and effectiveness for use in Physical Education, Sports, and Health (PJOK) learning at the elementary school level. During the validation stage, the teaching module obtained a score of 92.25% from the subject matter expert and 92.25% from the media expert, both of which were categorized as very valid. These results indicate that the developed module met the requirements related to content feasibility, presentation quality, language appropriateness, and graphical design. Furthermore, the module was found to be aligned with the intended learning outcomes, the characteristics of elementary school students, and the instructional needs of volleyball overhand serve learning.

The practicality testing results revealed that the teaching module achieved a score of 95.00% based on teacher responses and 92.50% based on student responses, both of which were classified as very practical. These findings demonstrate that the module is easy to use in the learning process for both teachers and students. The clarity of instructions, systematic organization of learning materials, understandable language, and the inclusion of movement illustrations were identified as the primary factors contributing to the high practicality level of

the module. The module assisted teachers in organizing learning activities more effectively while helping students understand the learning materials and engage in independent practice.

The effectiveness testing results showed that the developed teaching module was successful in improving students' learning outcomes. Of the 25 students who participated in the learning activities, 22 students achieved learning mastery, resulting in a classical mastery percentage of 88%, while only 3 students did not achieve mastery. These findings indicate that the developed module was effective in teaching the volleyball overhand serve technique. The effectiveness of the module can be attributed to the systematic presentation of learning materials, structured practice activities, and learning experiences that were tailored to the characteristics and needs of elementary school students.

The findings of this study are consistent with those reported by Depari (2025), who argued that teaching modules developed according to students' needs can enhance instructional quality and facilitate students' understanding of learning materials. Similarly, the results support the findings of Wardani et al. (2025), who concluded that the use of teaching modules can increase students' learning motivation, engagement in the learning process, and academic achievement. Therefore, teaching modules function not only as learning resources but also as instructional tools that support students in developing independent and sustainable learning habits.

Overall, this study demonstrates that the development of a volleyball overhand serve teaching module provides an effective solution to the limited availability of instructional materials in elementary school PJOK learning. The developed module offers a more structured learning experience, assists teachers in implementing systematic instruction, and improves students' learning outcomes in mastering the volleyball overhand serve technique. Consequently, the module is recommended as a learning resource for PJOK instruction and may serve as a reference for the development of instructional materials in other sports-related topics at the elementary school level.

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