



Development of Digital Teaching Materials for Basic Volleyball Underhand Passing Techniques at Public Elementary School Sigong

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Abstract

Study purpose. The purpose of this study is to implement the development of digital teaching materials on basic volleyball techniques at SDN 4 Sigong. The teaching materials resulting from the development research were tested for validity and usability.

Materials and methods. This research was conducted from April to September 2024 at SDN 4 Sigong. The subjects of this research were expert lecturers and teachers of physical education and health. The instrument used for this research was a questionnaire. Data analysis techniques used percentage formulas.

Results. The results of the study, as seen from the validation results, were 91.1% for physical education teachers, 95.5% for expert lecturers in physical education 1, 89.7% for expert lecturers in physical education 2, and 88.2% for physical education teachers. These percentages resulted in a final score of 91.1%. These percentages meet the criteria for high validity. These percentages meet the criteria for high validity.

Conclusion. Thus, the teaching material on the basic technique of underhand volleyball passing can be used as alternative or supporting teaching material in teaching the basic techniques of volleyball to sixth-grade primary school students.

Keywords: Teaching Materials, Digitalisation, Volleyball

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Introduction

Physical Education, Sports and Health (PJOK) is one of the subjects taught at all levels of education (Sembiring et al., 2022). Physical Education, Sports and Health (PJOK) is a subject designed to develop positive behaviour in students through physical activity. In volleyball, physical fitness, healthy living behaviours, and motor skills can be developed. Volleyball instruction in the 2013 curriculum is integrated into KD 3.1, which analyses the basic technique of underhand passing in volleyball, and 4.1, which practises the basic technique of underhand passing in volleyball. Based on the basic competencies above, it can be concluded that the two basic competencies complement each other. In other words, a student cannot practise basic underhand passing techniques before understanding basic underhand passing techniques.

Good teaching materials are those that cover all aspects of teaching materials. (Kurniasih., Latar, Idris Moh., Tahapary, 2024) states that aspects of teaching materials include material suitability, language, material presentation, and graphics. Material suitability can be adjusted to KI and KD, student development and teaching material requirements. Based on the above description, a teacher has the responsibility to guide their students to achieve the basic competencies to be taught. In order to achieve the basic competencies to be taught, a teacher needs teaching materials. According to (Khasanah & Pd, 2024) stating that teaching materials are all forms of materials used to assist teachers in carrying out the teaching and learning process. This was also expressed by (Saputra & Wahyudi, 2022) Teaching materials are a set of materials that are systematically arranged, both written and unwritten, to create an environment that enables students to learn.

After understanding and studying the theory of teaching materials, the author conducted interviews with Physical Education and Health (PJOK) teachers at SDN 4 Sigong regarding the use of teaching materials. The results of the interviews showed that SDN 4 Sigong still uses teaching materials published by the Ministry of Education and Culture. In addition, teachers at SDN 4 Sigong said that the teaching materials were not varied enough and needed to be updated in line with the circumstances of the students. In this regard, the author analysed the teaching materials from the Ministry of Education and Culture used by educators at SDN 4 Sigong. The author's analysis was based on the theory of teaching material aspects that had been studied previously.

From a linguistic perspective, the teaching materials published by the Ministry of Education and Culture use language that is appropriate for the age of the students, making them easy to understand. From a graphic design perspective, the teaching materials published by the Ministry of Education and Culture have attractive covers. From a material suitability perspective, the materials published by the Ministry of Education and Culture contain Physical Education, Sports and Health (PJOK) material in accordance with the 2013 curriculum and cover cognitive, affective and psychomotor aspects. However, the basic volleyball technique material does not include videos demonstrating the correct basic techniques. Inside the book, the layout used is very attractive, and the illustrations presented represent each of the materials described. Based on the above description, the author believes that there is a need to develop digital teaching materials on the basic technique of underhand passing in volleyball at SDN 4 Sigong as alternative or supporting teaching materials for the Kemendikbud teaching materials.

Materials and Methods

Study participants.

In this study, the subjects were sixth-grade students and physical education and health teachers. Based on the above, the target products in this study were sixth-grade students and physical education and health teachers.

Study organization

The research design in this study was developed by (Branch, 2010) to design learning systems, namely the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) development model. The ADDIE model research design can be used for various types of teaching materials, models, strategies, methods, and learning media development.

Statistical analysis.

The author used numerical data from the validation questionnaire to obtain validation results. The validation questionnaire was completed by lecturers specialising in physical education, sports and health, teachers of physical education, sports and health at SDN 4 Sigong,

and sixth-grade students at SDN 4 Sigong. The formula used by the author to calculate the scores is as follows.

$$\text{Assessment results} = \frac{TSe}{TSh} \times 100\% = \dots\%$$

Explanation:

TSe = total empirical score (results obtained from the validation sheet)

TSh = total maximum score (expected competency test results)

Results

This development research began with the preparation of teaching materials, which were designed based on the 2013 Revised Curriculum, containing Basic Competency 3.1, analysing the basic techniques of underhand passing in volleyball, and 4.1, practising the basic techniques of underhand passing in volleyball. These two Basic Competencies are the basic competencies that must be achieved by students in learning the basic techniques of underhand passing in volleyball. After the subchapter on teaching materials for the basic techniques of underhand passing in volleyball had been completed, the next step was to validate the teaching materials for the basic techniques of underhand passing in volleyball. The subchapter on teaching materials for the basic techniques of underhand passing in volleyball was validated by three validators. Validator 1 was Sodikin, S.Pd., a physical education teacher at SDN 4 Sigong, validator 2 was Dewi Wahyuni, M.Pd., and H. Adiman, SE., M.Pd, a lecturer in physical education at the Faculty of Education and Teacher Training, Nahdlatul Ulama University, Cirebon. In addition, the author also distributed questionnaires to sixth-grade elementary school students to determine their responses to the subchapter on basic volleyball underhand passing techniques that the author had designed.

1. Subject Teacher Validation

Table 1. Summary of PJOK Subject Teacher Validation Results

No	Aspect	Assessment
1	Material Aspects	95,8 %
2	Linguistic Aspects	100 %
3	Material Presentation Aspects	95 %
4	Graphic Aspects	87,5 %
Total Points Earned		1.625
Maximum Total Points		1.700
Average Score		95,5%

Based on the table above, it can be seen that the total score obtained was 1,625 out of a maximum total score of 1,700, with an average score of 95.5%. The calculation of the score obtained is as follows.

$$\text{Validasi} = \frac{TSe}{TSh} \times 100\%$$

$$\begin{aligned} \text{Validasi} &= \frac{1.625}{1.700} \times 100\% \\ &= \mathbf{95,5\%} \end{aligned}$$

2. Validasi Dosen Ahli 1

Table 2. Summary of Expert Lecturer Validation Results 1

No	Aspek	Penilaian
1	Material Aspects	95,8 %
2	Linguistic Aspects	93,7 %
3	Material Presentation Aspects	95 %
4	Graphic Aspects	100 %
Total Points Earned		1.525
Maximum Total Points		1.700
Average Score		89,7 %

Based on the table above, it can be seen that the total score obtained was 1,525 out of a maximum total score of 1,700, with an average score of 89.7%. The calculation of the score obtained is as follows.

$$\text{Validation} = \frac{TSe}{TSh} \times 100\%$$

$$\text{Validation} = \frac{1.525}{1.700} \times 100\%$$

$$= \mathbf{89,7 \%}$$

3. Expert Lecturer Validation 2

Table 3. Summary of Expert Lecturer Validation Results 2

No	Aspect	Assessment
1	Aspek Materi	91,6 %
2	Aspek Kebahasaan	87,5 %
3	Aspek Penyajian Materi	90 %
4	Aspek Grafika	75 %
Total Nilai yang Diperoleh		1.500
Total Nilai Maksimal		1.700
Nilai Rata-Rata		88,2 %

Based on the table above, it can be seen that the total score obtained was 1,500 out of a maximum total score of 1,700, with an average score of 88.2%. The calculation of the score obtained is as follows.

$$\text{Validation} = \frac{TSe}{TSh} \times 100\%$$

$$\text{Validation} = \frac{1.500}{1.700} \times 100\%$$

$$= \mathbf{88,2 \%}$$

Recapitulation of Teaching Material Validation

The author has validated the teaching materials for basic volleyball underhand passing techniques with one physical education teacher and two sports lecturers. The author conducted the validation stage to determine the suitability of the digital-based teaching materials for basic

volleyball underhand passing techniques that the author had compiled. The following is a summary of the validation results from one physical education teacher and two sports lecturers.

Table 4. Recapitulation of Subject Teacher and Expert Lecturer Validation

No	Validator	Presentase
1	Subject Teacher	95,5 %
2	Expert Lecturer 1	89,7 %
3	Expert Lecturer 2	88,2 %
Average Score		91,1 %

Based on the results of the validation recapitulation by one subject teacher and two sports lecturers on the teaching materials for basic volleyball underhand passing techniques for primary schools, an average score of 91.1% was obtained. The results were declared to be highly valid or usable in teaching basic volleyball underhand passing techniques to Year 6 primary school students, but minor revisions were needed. The following are the calculations.

$$\text{Validation} = \frac{TSe}{TSh} \times 100\%$$

$$\text{Validation} = \frac{274}{300} \times 100\%$$

$$= 91,1 \%$$

1) Product Effectiveness (Through Trials)

Based on the results of the validation of the subchapter on basic volleyball passing techniques conducted by physical education teachers and sports lecturers, it can be concluded that the teaching materials on basic volleyball passing techniques are valid and suitable for use in teaching sixth grade elementary school students, but require some revision. Therefore, the author has made improvements to several parts of the subchapter on basic volleyball passing techniques that has been created. The following are the suggestions and feedback provided by the validators.

Table 5. Results of Improvements to Teaching Materials for Basic Volleyball Skills: Underhand Passing

No	Recommendations	Repairs
1	Improve the colour of the front cover.	Improving the colour of the front cover
2	Improve the writing and colour of the concept map.	Improving the writing and colour of the concept map
3	Add videos to learning activities.	Adding instructional videos

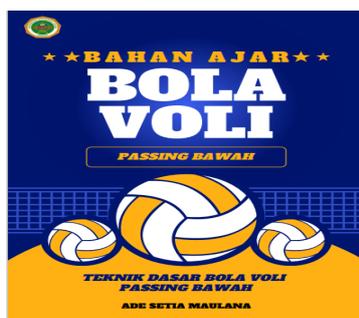


Figure 1. Colour correction of the front cover

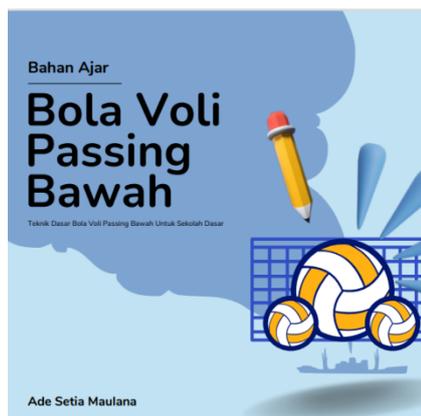


Figure 2. Results of the front cover colour correction

Figures 1 and 2 show the front cover. Before validation, the front cover appeared very dark in colour. After validation, the front cover was adjusted and given a book-like appearance.

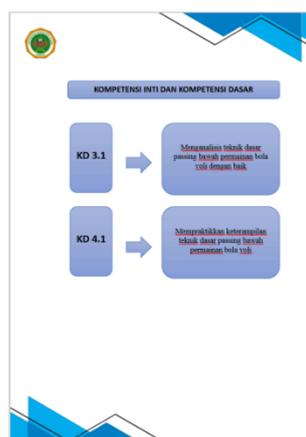


Figure 3. Improvements in KI & KD Writing

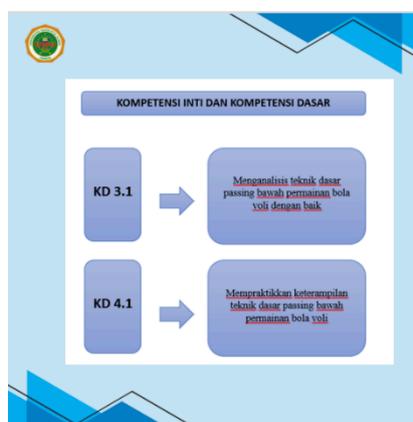


Figure 4. Results of KI & KD Writing Improvements

Figures 3 and 4 are concept maps. Before validation, the writing of KI & KD in the concept map was unstructured and there were no additional images. After validation, KI & KD were adjusted and given a cover colour.



Figure 5. Improvements to Educational Videos

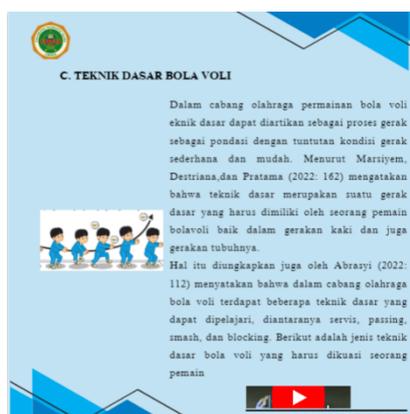


Figure 6. Repair Results

Based on Figures 5 and 6 on Learning. Before validation, there were no videos in the learning activities. After validation, videos were added to the learning activities. This was done to make the teaching materials more interesting.

2) Final Draft of Digital-Based Basic Underhand Passing Volleyball Teaching Materials

Based on the validation results conducted by the Physical Education teacher and sports lecturer, it can be concluded that the teaching materials on basic underhand passing techniques in volleyball are valid and suitable for use in teaching sixth grade primary school students. The following is the final draft of the teaching materials based on the suggestions and input from the validators.

Discussion

Research on the development of digital-based volleyball teaching materials to assist sixth-grade primary school students with their difficulties. The difficulties referred to are in the basic techniques of volleyball, which are not yet well developed. The results of this research

and development are based on theoretical foundations, concepts, and teaching material components that are designed to be interrelated. This teaching material can be used in both practical and non-practical learning situations and contributes positively to improving the skills of sixth-grade elementary school students in basic passing techniques.

In the validation, a score of 91.1% was obtained for the results of the PJOK subject teacher, a score of 95.5% for the expert lecturer in Physical Education 1, a score of 89.7% for the results of the expert lecturer in Physical Education 2, and a score of 88.2%. These percentages indicate a final score of 91.1%. These percentages met the criteria for validity. Thus, the teaching materials for basic volleyball passing techniques could be used as alternative or supporting teaching materials in teaching basic volleyball techniques to Year 6 primary school students. In addition to conducting a validation test with the physical education teacher and two sports lecturers, the author also implemented the teaching materials with Year 6 primary school students. This was done to determine the students' response to the teaching materials that had been developed. The results of the implementation obtained a final score of 82.6%. This result falls into the category of sufficiently valid. Thus, students can use these teaching materials in volleyball learning activities.

Essentially, the teaching materials developed can encourage independent learning among sixth-grade primary school students because they enable them to learn the basic techniques of underhand volleyball passing properly. These teaching materials can be used anywhere and anytime, with attention paid to correct and appropriate language. In addition, supporting elements such as illustrations in the form of pictures, tables, and so on are provided. This is done to make the teaching materials on basic underhand volleyball passing techniques more interesting. The compilation was carried out with the help of the Canva and Heyzine applications. The results of this study are in line with (Hamdhan Utama & Cholid, 2021) stating that teaching materials are divided into four types, namely 1) printed teaching materials, which are teaching materials that can be produced on paper, including handouts, books, modules, student worksheets, brochures, leaflets, wall charts, photos/pictures, and models/markets; 2) audio teaching materials, which are teaching materials that must be used through devices that can produce sound, such as cassettes, radios, vinyl records, and audio compact discs; 3) audio-visual teaching materials, which are teaching materials that are presented through sound and sight, such as video compact discs and films; 4) interactive teaching materials, such as interactive compact discs. Based on the above opinions, it can be understood that if one wishes to develop teaching materials, it is necessary to consider the aspects that influence student learning.

The process of determining teaching materials remains oriented towards the principles of physical education, namely from the easy stage to the more complex stage. Kurniasih and Sani (in Purwanto & Risdianto, 2022: 8) state that the suitability of the material must be in accordance with the KI and KD, child development, teaching material requirements, the accuracy of the learning material content, the benefits of increasing knowledge, and must be in accordance with moral and social values. This explains that in compiling teaching materials, these aspects must be considered because the material aspect is the most important part of teaching materials. This is the basis for the suitability of the content or material to be in accordance with the basic competencies so that students obtain knowledge in accordance with the learning objectives.

After the teaching materials were validated by the Physical Education teacher and two expert lecturers, the author found the advantages of digital-based basic volleyball passing techniques teaching materials. The advantage of these teaching materials lies in their digital format, which makes them more practical and easy to use anywhere and anytime. In addition, the digital teaching materials compiled by the author do not require special storage space and are more economical than printed or conventional teaching materials.

Conclusions

The results of this study can be summarised as follows: The teaching materials developed in this study are digital-based teaching materials for basic volleyball underhand passing techniques. These teaching materials cover Basic Competency 3.1, which is to analyse basic underhand passing techniques in volleyball, and 4.1, which is to practise basic underhand passing techniques in volleyball. The basic volleyball technique used in these teaching materials is underhand passing. The title of the teaching materials is 'Development of Digital Teaching Materials on Basic Volleyball Underhand Passing Techniques at SDN 4 Sigong'. In the process of compiling the teaching materials, reference was made to the aspects of teaching material compilation, namely 1) material feasibility, 2) language, 3) material presentation, and 4) graphics. In addition, the outline of the digital-based teaching material for the basic volleyball technique of underhand passing consists of three parts, namely 1) the initial part consisting of the front cover, title page, foreword, table of basic competencies and core competencies; 2) the content part consisting of core competencies, basic competencies, learning objectives, and learning materials; 3) the final part consisting of group assignments. After the teaching materials were completed, the author conducted a validation test with physical education teachers and two expert lecturers.

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