Developing Problem-Based Learning Model through Digital Video Media to Increase Knowledge about Volleyball Game for Senior High School Students Grade XI

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ABSTRACT: This study constructs a problem-based learning model through digital video media to increase knowledge of materials related to volleyball game and to test the effectiveness of problem-based learning model through digital video media to increase knowledge about volleyball game. The development model used in this study is research and development with the Borg and Gall approach model through 6 stages include preliminary study, development planning, initial product development, feasibility test (small-scale trial, revision), feasibility test (large-scale trial, revision), effectiveness test. The validation test in this study was carried out through one expert of each category, which included instrument, media, and material experts. Small-scale trial (36 respondents) and large-scale trial (72 respondents). The results showed that the volleyball game learning used problem-based learning model through digital video media in the form of materials with a score of 29 is in (good) category, digital video with a score of 31 is in (good) category and practice questions with a score of 41 is in (very good) category. Validity data is obtained from expert validation. The feasibility of the learning model is obtained from the responses of learners who meet clear criteria. Effectiveness data were obtained from achieving conventional learner learning outcomes and learning using problem-based learning models using digital video media to increase knowledge about volleyball game materials using model developed to meet effective criteria. The achievement of student learning outcomes before applying the Problem-Based Learning model using digital video media with an average of 56.57 which is in a poor category; after applying the Problem-Based Learning model using digital video media obtained learning outcomes with an average of 94.07 which is in a very good category. Thus, the results of developing a Problem-Based Learning model through digital video media on volleyball game materials to increase knowledge of volleyball games are likely effective in achieving increased student learning outcomes.

KEYWORDS: PBL Model Development Through Digital Video Media, Volleyball, Knowledge

I. INTRODUCTION

The fundamental knowledge and skills of the 21st century prepare students to use technology and media meaningfully and aim for creativity and innovation, communication, research, and problem-solving (Russell: 2014, 11). From this understanding, it can be understood that 21st-century learning prepares students to use technology and learning media that aims for creativity, innovation, communication, research, and problem-solving or for improving students' life skills as a provision for facing life challenges to be lived. Volleyball is one of the major sports studied in the big ball field, played in teams; each team consists of six people. Stephani (2017) reveals that the selection of sports that will be used in the learning activities of students with the characteristics of group games allows the creation of complex game situations and demands appropriate decision-making. One of the characteristics of learning sports with group games is volleyball materials. As technology developed, various printed teaching materials emerged, then spread to audio teaching materials, audio-video teaching materials and interactive teaching materials with computers. Learning activities can also be done anywhere and in several ways, including television, video cassette, video compact disc or computer.

Some research results show that conventional methods still need to be more effective in improving student learning outcomes. The results of Muhamad Nurzaman's research (2017) entitled "The Influence of Inquiry and Conventional Learning Models on the Formation of Self-Esteem" shows that the results of forming self-esteem in fostering pencak silat in groups of

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students taught through conventional methods are less than optimal. Then the research from Mesa Rahmi Stephan, et al. (2017) entitled "The Influence of Inquiry Model on Critical Thinking Ability and Basketball Playing Skills". The results showed no significant improvement between pre-test and post-test scores on critical thinking skills in groups of students who used the conventional learning model. Thus, using conventional methods is less than optimal for improving the ability to think critically and learn from students.

According to Pribadi (2011:42), to compile teacher learning, it is necessary to know the characteristic factors of students, including (1) the character of students in general, (2) their initial competence or ability, (3) learning models, and (4) motivation. In child development psychology, senior high school students are included to teenagers, which has unique characteristics. According to Sukintaka (1992: 45-46), the characteristics of high school students between the ages of 16-18 include: a) Physical: (1) muscular strength and muscular endurance develop very well, (2) happy with good skills, even influence on acrobatic movements, (3) the boy's physical state is mature enough, (4) girls' body proportions become better, (5) able to use energy well, (6) able to build willpower with an amazing spirit. ; b) Psychic and Mental: (1) think a lot of themselves, (2) mentally become stable and mature, (3) need experience of all things, (4) very happy about ideal things and happy when deciding on problems.; c) Social: (1) aware and sensitive to the opposite sex, 2) independent of all things, (3) try to escape from the environment of adults or educators, (4) happy about the social development problem, (5) happy about the social development problem, (6) conscious of looking good and how to dress neatly and well, (7) not happy with the conditions set by both parents, (8) The views of his group greatly determine his attitude.

Based on the Regulation of the Minister of Education and Culture Number 65 of 2013 concerning Process Standards, the appropriate learning models to support the implementation of the 2013 Curriculum are the Inquiry-Based Learning, Discovery Learning, Project Based Learning and Problem-Based Learning/PBL models. Looking at the problems that exist in senior high school, the teacher must be able to design learning materials to help students increase their potential in critical thinking and solve existing problems to improve their learning outcomes. Thus, this study will develop a PBL (problem-based learning) model. According to Sanjaya (2011: 214), problem-based learning model/PBL has three main characteristics, namely: The problem-based learning model/PBL is a series of learning activities, meaning that in the implementation of the problem-based learning model, there are several activities that students must do. The problem-based learning model/PBL does not expect students to listen, take notes, and memorize the subject matter. However, through the problem-based learning model/PBL, students actively think, communicate, search and process data, and finally conclude.

Following up on the aforesaid background, this study is more sharpened on the development of PBL (Problem-Based Learning) learning models on a material related to volleyball game by utilizing technology in the form of digital video media to improve the ability to analyze the knowledge of movement skills of Senior High School Students Grade XI. Utilization of technology that develops in the development of problem-based learning models is certainly needed to equip students to face the challenges of education in the 21st century. Therefore, researchers are interested in conducting development research entitled "Developing Problem-Based Learning Model Through Digital Video Media to Increase Knowledge about Volleyball Game for Senior High School Students Grade XI".

II. MATERIALS AND METHOD

The research carried out is included in the type of research and development (R&D). This type of research aims to produce a certain product and test the effectiveness of the product (Sugiyono, 2013). In this study, the product developed was a digital video medium for learning the basic techniques of volleyball games, including up and down passing, serving, smash and block in volleyball games. The digital video media developed in this study refers to the development model of Borg & Gall (1983). This type of R&D research, according to Borg & Gall (1983), is a process for developing and evaluating educational products.

The development procedure in this study refers to the adaptation of the development model of Borg & Gall (1983), namely: 1) information collection; 2) planning; 3) initial product development; 4) initial trials; 5) initial product revisions; 6) field trials; 7) operational product refinements; 8) field implementation tests; 9) final product refinements, and; 10) dissemination. However, in this analysis, it is simplified into six stages of research.

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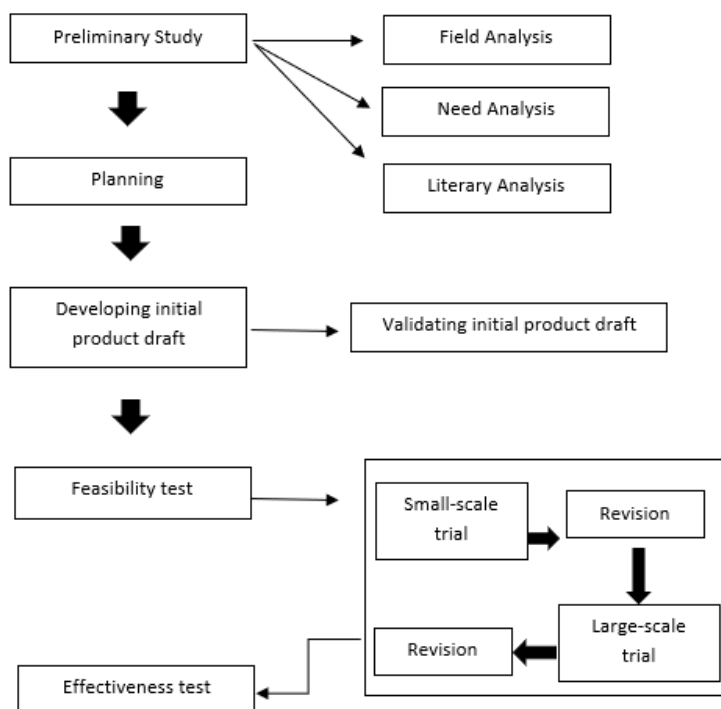

Figure 1. R&D Research Procedure adapted from Borg & Gall (1983)

Table 1. Expert Validation Assessment Results

Validator Name	Expert Validation	Earned Score	Maximum score	Categoty
Dr.Yudanto, S.Pd.,Jas.,M.Pd.	Material Expert	29	48	Good
Dr. Drs. Agus Sumhendartin Suryobroto, M.Pd..	Expert Questionnaire	41	48	Very Good
Hendri Permana, M.Or.	Video Expert	31	48	Good

The results obtained from the three experts can be concluded that the Problem-Based Learning model on volleyball game materials to increase the knowledge of senior high school students has good content validity or is feasible to continue at the trial stage.

Based on the revisions obtained, a Problem-Based Learning model was produced through digital video media on volleyball game materials to increase the knowledge of Prambanan Senior High School Students, which will later be used for trials in the next stage.

Table 2. Assessment Criteria of Practice Questions for Small-Scale Trial

No	Assessment Category	Value Interval
1.	Very Good	85 − 100
2.	Good	75 − 84
3.	Poor	65 − 74
4.	Very Poor	… − 64

Table 3. Score Results of Practice Questions for Small-Scale Trial

School	Score Average	Category
Pre-test Senior High School 1 Prambanan	59.259	Very Poor
Post-test Senior High School 1 Prambanan	90	Very Good

Based on the results of practice questions assessment obtained from Senior High School 1 Prambanan, on a small scale, it was obtained an average value of 90. Thus, the value of small-scale trials is categorized as "Very Good". The response to the use of

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digital video media is also used as a reference as a result of the learning carried out in this development so that later researchers know the results of development and whether or not it is effective in increasing the knowledge of students, using categories that are very clear, clear, unclear and very unclear. The responses from the participants obtained the following results:

Table 4. Results of Students' Responses for Small-Scale Trial

Item	Very clear	Clear	Unclear	Very Unclear	Total
Q1	27	9	0	0	36
Q2	21	15	0	0	36
Q3	25	11	0	0	36
Q4	21	15	0	0	36
Q5	29	7	0	0	36
Q6	27	8	1	0	36
Q7	27	9	0	0	36
Q8	26	10	0	0	36
Q9	30	6	0	0	36
Total	233	90	1	0	324
Percentage	71.9%	27.8%	0.3%	0.0%	100.0%

Based on the results of the response to the use of products developed based on the results obtained from the students of Senior High School 1 Prambanan, it can be seen that in very clear category obtained a total of 233 or 71.9%, in clear category obtained a total of 90 or 27.8%, in unclear category obtained a total of 1 or 0.3% and in very unclear category obtained 0 or 0.0%.

Thus, it can be concluded that the Problem-Based Learning model through digital video media on volleyball game materials developed in this small-scale trial is in a very clear category. With the acquisition of the above results, it can be concluded that development by using Problem-Based Learning through digital video media on volleyball game materials to increase the knowledge of senior high school students can be continued in large-scale trials.

The stage in the large-scale test is a follow-up to the small-scale test that has been carried out. This trial was carried out in a wider scope or on a larger scale which were in two schools, including Senior High School 1 Wedi and Senior High School 2 Klaten which were taken from each school by 36 students.

In the stage of large-scale trials, two tests were carried out, namely with pre-test and post-test. Pre-test here is not done learning with the model of Problem-Based Learning through digital while post-test learning is done with the model of Problem-Based Learning through digital video media. The following assessment results have been carried out in two schools Senior High School 1 Wedi and Senior High School 2 Klaten obtained the following results:

Table 5. Results of Pre-test on Large-Scale Trial

School	Average Score	Category
Senior High School 1 Wedi	57.03	Very Poor
Senior High School 2 Klaten	56.11	Very Poor
Total Average	56.57	Very Poor

Table 6. Results of Post-test on Large-Scale Trial

School	Average Score	Category
Senior High School 1 Wedi	93.88	Very Good
Senior High School 2 Klaten	94.26	Very Good
Total Rata-rata	94.07	Very Good

Based on the assessment results of practice questions obtained from the three schools on a large scale, and each class took an assessment with pre-test and post-test intending to know the difference and how much the product's effectiveness developed, it was acquired the average value of the pre-test result of 56.57 with very poor category and the average acquisition of the result value of the post-test value of 94.07 with very good category.

From the two results obtained, both pre-test and post-test, using Problem-Based Learning models through digital video media on volleyball game materials effectively increases students' knowledge compared to conventional learning. Thus, the value of large-scale trials is categorized as good.

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The response to the use of digital video media is also used as a reference as a result of the learning carried out in this development so that later researchers know the results of development and whether or not it is effective in increasing the knowledge of students, using categories that are very clear, clear, unclear and very unclear.

A test item is declared valid if the r count is greater than the r table with a significance level of 5%. The r table of 34 participants was 0.339. From the practice questions package, there are no question item with a value of r below 0.339. So it is known that all the items of the practice questions are more than r table or valid. So it can be said that the above practice questions package is good or valid.

To see the level of reliability can be seen from the alpha value. If the reliability coefficient is ≥ 0.700, the test tested for reliability is reliable. Whereas if the reliability coefficient is < 0.700, it is declared unreliable. Based on the results of the analysis that has been done, it can be said that the package is reliable because it has a reliability coefficient of more than 0.700 which is 0.888. The normality test was to find whether the data were normally distributed or not. The results of the SPSS normality test output from small-scale results from data before and after using the Problem-Based Learning model through digital video media can be shown in the following table:

Table 7. Normality Test Data of Pre-test and Post-test Results

Data	Sig	Limit	Description
Pre-test	0.643	0,05	Normal
Post-test	0.080	0,05	Normal

Based on the table above, it is known that the Kolmogorov-Smirnov value is greater than 0.05, so it is concluded that the small-scale test data is normally distributed. While the results of Kolmogorov-Smirnov for large-scale trials of data before using the Problem-Based Learning model through digital video media are as follows:

Table 8. Pre-test dan Post-test Results Data

Data	Sig	Limit	Description
Pre-test of Senior High School 1 Wedi	0.288	0.05	Normal
Post-test of Senior High School 1 Wedi	0.062	0.05	Normal
Pre-test of Senior High School 2 Klaten	0.704	0.05	Normal
Post-test of Senior High School 2 Klaten	0.056	0.05	Normal

Based on the table above, it is known that the Kolmogorov-Smirnov value is greater than 0.05, so it is concluded that the large-scale test data (Pre-test and Post-test) are normally distributed.

The results of field trials show that the Problem-Based Learning model uses digital video media on volleyball game materials to increase the knowledge of high school students developed meet effective criteria. The application of the Problem-Based Learning model using digital video media shows a significant improvement compared to before applying Problem-Based Learning using digital video media. It is based on the achievement of student learning outcomes before applying the Problem-Based Learning model using digital video media with an average of 56.57 with poor category. After applying the Problem-Based Learning model using digital video media, learning outcomes were obtained with an average of 94.07 with very good category.

III. DISCUSSION

The feasibility test of the product aims to see the feasibility of the product to be tested by the research subjects. The product developed using the Problem-Based Learning model uses digital video media on volleyball game materials to improve the critical thinking skills of high school students produced in the study has met the eligibility criteria based on the results of field trials. The results of the feasibility assessment were obtained from students' responses, which showed that the Problem-Based Learning model using digital video media on the volleyball game materials used was in the very clear category. The results of the analysis were known that from the responses of students on a small scale of 36 respondents obtained a percentage of 92.90% which was in the range of 76% - 100% with very feasible category, while for the responses of students on a large scale of 72 respondents (36 respondents for each school) obtained a percentage of 82.56% for Senior High School 1 Wedi and obtained a percentage of 89.20% for Senior High School 2 Klaten which was in the range of 76% - 100% with very feasible category.

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The results of field trials show that the Problem-Based Learning model uses digital video media on volleyball game materials to increase the knowledge of high school students developed to meet effective criteria. The application of the Problem-Based Learning model using digital video media shows a significant improvement compared to before applying Problem-Based Learning using digital video media. It is based on the achievement of student learning outcomes before applying the Problem-Based Learning model using digital video media with an average of 56.57 with poor category. After applying the Problem-Based Learning model using digital video media, learning outcomes were obtained with an average of 94.07 with very good category.

The product developed is the development of the Problem-Based Learning model through digital video media to increase knowledge of volleyball game materials. The results showed that the volleyball game learning used a problem-based learning model through digital video media in the form of material with a score of 29 (good category), digital video with a score of 31 (good category) and practice questions with a score of 41 (very good category). Then the feasibility assessment is also obtained from the results of student responses which shows that the development of the Problem-Based Learning model through digital video media to increase knowledge of the volleyball game material is related to the learning that has been carried out with teachers and researchers. These results are based on acquiring assessment categories that meet the clear categories. The feasible criteria are also based on the results of the implementation of learning to meet the category very well. Based on the study's results, it is known that developing the Problem-Based Learning model through digital video media to increase knowledge of volleyball game materials meets effective criteria. The criteria are based on the achievement of student learning outcomes which shows a significant improvement compared to before applying the Problem-Based Learning model through digital video media. The achievement of student learning outcomes before applying the Problem-Based Learning model using digital video media with an average of 56.57 with a poor category. After applying the Problem-Based Learning model using digital video media, it is obtained learning outcomes with an average of 94.07, which is a very good category.

IV. CONCLUSION

The results of developing a video-based Problem-Based Learning model using digital video media on volleyball game materials to increase knowledge about volleyball games are likely effective in achieving increased student learning outcomes.

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