

Practicality of Physics Learning Tools using Blended Learning Model with Video Assistance on Momentum and Impulse Materials to Improve Problem Solving Ability of Students

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Abstract: This study aims to determine the practicality of physics learning tools using blended learning model with video assistance on momentum and impulse materials to improve problem solving ability of students. This research is development research, where researchers have developed learning tools with valid categories to further see the practicality of the devices developed after testing. The research design used is a 4D model consisting of define, design, develop and disseminate. The tools developed consist of a syllabus, lesson plans, student worksheets, teaching materials, learning videos, and problem-solving ability assessment instruments. The research instrument used was a student response questionnaire and an observation sheet on the implementation of learning. The results of the analysis show that the device meets the very practical criteria seen based on the positive response of students to learning reaching 97.48% in the very practical category, and the learning implementation observation sheet reaches an average of 93.77% in the very practical category. This shows that physics learning tools using a blended learning model with video assistance on momentum and impulse materials are very practical to improve problem-solving ability of students.

Keywords: Blended learning model; Learning tools; Problem-solving ability.

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INTRODUCTION

Physics is one part of Natural Sciences, which is a science that studies symptoms, events, or natural phenomena and reveals all the secrets and laws of the universe. Physics as a product is the result of scientific activities carried out in the form of concepts, principles, theories, and the laws of physics itself (Gunawan, 2017). Physics is a science that is considered difficult and boring by most students because it is focused on memorizing formulas, resulting in a lack of ability to solve problems (Annam et al, 2020; Azizah et al, 2022). In addition, the limited learning space and time during this pandemic condition, causes students to not be given optimal material, this is because teachers only give assignments from home, do practice questions as a substitute for learning at school, and demand students to be more active. independent learning (Kartini et al, 2019; Khasanah et al 2019).

Based on the results of interviews conducted with teachers and students at SMAN 1 Mataram, students assume that during the current pandemic conditions, teachers often provide practice questions which results in students having limited ability to answer questions, so students' problem-solving abilities are low. The learning model that is often used in schools is conventional learning with lecture and discussion methods, this is not following the current pandemic conditions (Doyan et al, 2022). In working on physics

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questions given by the teacher, students more often directly use mathematical equations without analyzing, guessing the formula used, and memorizing examples of questions that have been done to work on other questions (Hardiyansyah et al, 2019; Doyan et al, 2020). Students have difficulty when dealing with complex problems. In addition, the cause of the low problem-solving ability of students is that teachers as educators still tend to dominate in the learning process, so that students are only objects in learning activities and are not allowed to find out the truth of the physics concepts they learn (Doyan et al, 2021).

To overcome these problems, the teacher must change the learning model that is carried out so that students are interested and have the enthusiasm to keep learning even in a pandemic condition. One of the learning models that are suitable for the current pandemic condition is the blended learning model (Putri et al, 2022). Blended learning is mixing between online and face-to-face in an integrated learning activity (Doyan et al, 2022).

Teaching physics will be more effective if the learning can train and develop thinking skills possessed by students so that they can communicate, interact, and collaborate (Susilawati et al, 2022). Physics learning in schools in general uses tools to facilitate the delivery of material, one of the technology-based media that can lead to interaction and reciprocity that develops in the world of education today, namely learning videos (Susilawati et al, 2021; Rahmana et al, 2021).

In line with this, it is necessary to be innovative and creative in teaching efforts that lead to the achievement of learning objectives. Success in the learning process is strongly influenced by the learning tools used. Based on this, it is necessary to develop physics learning tools. This will increase the skills of teachers in teaching and the ability of students will also increase, especially the problem-solving abilities of students. Based on this, it is necessary to develop physics learning tools so that the problem-solving ability of students can increase.

METHOD

This study aims to describe the practicality of physics learning tools using a blended learning model with video assistance on momentum and impulse materials to improve problem-solving ability of students. The learning devices were developed using a 4D model which includes the stages of define, design, develop and disseminate (Sugiyono, 2017). Data on the practicality of learning devices were obtained from observation sheets on the implementation of learning and participant response questionnaires. students, which are then analyzed to determine the average percentage with Equation 1.

$$S = \frac{n}{N} \times 100\% \quad (1)$$

Where S is the average value of the percentage, n is the total score of the raters, and N is the maximum number of scores. The data that has been analyzed is then interpreted the data based on practical criteria. The level of practicality of the instrument is determined based on table 1 (Arikunto, 2010).

Table 1. Practical Criteria for Learning Devices

Percentage Value	Category
0 – 20	Not practical
21 – 40	Less practical
41 – 60	Practical enough
61 – 80	Practical
81 – 100	Very practical

RESULT AND DISCUSSION

The analysis of the practicality of learning devices aims to determine the practicality of learning devices developed to be applied in the learning process. Data on the practicality of learning devices were obtained through limited trials. Data was collected by filling out a questionnaire on the practicality of learning devices by students and observers using a Likert scale consisting of 1 to 4 scores, where 1 means not good, 2 means not good, 3 is good, and 4 is very good.

The practicality of learning devices is determined through an analysis of student assessments and the implementation of learning. Both data were collected after the researchers conducted a limited trial. The

student's response aims to determine the practicality of learning devices in terms of the student's point of view as research subjects who are given treatment with video-assisted blended learning models. The students who responded were 33 students in the tenth grade of MIPA 4 at SMAN 1 Mataram. Data retrieval is done after learning is complete, through google forms.

The data on the practicality of learning devices consists of the responses of students and the implementation of learning. The results of student responses related to the learning that has been done can be seen in Table 2.

Table 2. Student Responses to Learning

Rated aspect	Percentage Value	Category
Learning physics using the blended learning model is interesting and not boring	97.73%	Very practical
Students easily understand the material that has been delivered by the teacher with the blended learning model	97.73%	Very practical
During the application of the blended learning model, it is easier to design a solution to solve a problem	97.73%	Very practical
Learning videos can help students to understand Momentum and Impulse material	96.97 %	Very practical
The language used in the learning video is following the Indonesian language rules so it is easy to understand	97.73%	Very practical
Submission of material in videos and teaching materials is connected with everyday phenomena related to Momentum and Impulse	96.97%	Very practical
Average	97.48%	Very practical

Based on the results of the tabulation of the responses of tenth-grade MIPA 4 students, it can be said that the implementation of physics learning tools using a blended learning model with video assistance on momentum and impulse materials is very practical to improve the problem-solving ability of students. This is because videos are very helpful for students in understanding the material (Susilawati et al, 2021; Rahmana et al, 2021). In addition, positive responses in learning can be seen from the tasks that are completed well by students and the activeness of students in the classroom when the teacher discusses the momentum and impulse material again (Susilawati et al, 2022).

The next analysis is an analysis related to the implementation of learning. The analysis aims to determine the practicality of learning devices through direct observation by observers. These observations are assessed from the ability of teachers to manage learning and student activities when learning takes place following the prepared lesson plans. The observers involved were 1 physics teacher at SMAN 1 Mataram. The assessment was used in the form of an observation sheet consisting of 15 statements in each meeting where the study was carried out in 3 meetings. The implementation of learning can be said to be practical if at least it is in the good enough category. The results of the analysis of the implementation of learning can be seen in Table 3.

Table 3. Results of Learning Implementation Analysis

Meeting	Average	Category
1	91.67%	Very practical
2	95.00%	Very practical
3	94.64%	Very practical

Based on the results of the analysis of the implementation of learning as shown in the table, the average score at the first meeting was 91.67% in the very practical category, the second meeting was 95% in the very practical category, and the third meeting reached 94.64% in the very category practical. This value interprets that on the implementation of practical learning for each meeting. Based on the results of the analysis, it can be seen that physics learning tools using a blended learning model with video assistance on momentum and impulse materials are very practical to improve the problem-solving ability of students. These results indicate that learning has taken place according to the plan contained in the lesson plan. The closer to 100%, the more positive the student's response to learning (Fatmawati et al, 2016). In addition, the product developed is said to be practical if the results of the respondent's practicality assessment are in the "good" or "very good" category (Pramita et al, 2016).

CONCLUSION

Physics learning tools using a blended learning model with video assistance on momentum and impulse materials to improve problem-solving ability of students have been successfully developed. Based on the results of the analysis of student responses and the analysis of the implementation of learning on average, the results are in a very practical category. These results indicate that the physics learning tools using blended learning model with video assistance on momentum and impulse materials are very practical to improve problem-solving ability of students.

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