

DEVELOPMENT OF PROBLEM-BASED LEARNING-BASED LEARNER WORKSHEETS (LKPD) ON THE SUBJECT OF HOOKE'S LAW AT SCHOOL MAS PLUS AL-ULUM MEDAN

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ABSTRACT

This study aims to determine the level of feasibility of Problem Based Learning based LKPD on Hooke's Law material based on material experts and media experts, and to determine the level of practicality of Problem Based Learning based LKPD on Hooke's Law material based on the response of teachers in the field of study and student responses. This research uses research and development methods or Research and Development (R&D). The LKPD feasibility test uses a Likert scale questionnaire validated by two validators. And the practical test of LKPD was carried out at MAS Plus Al-Ulum Medan school by teachers and students. Based on the results of the study, a material expert validator assessment of 72% was obtained, a media expert assessment of 80% with feasible / valid criteria. And based on the response of the physics teacher, a score of 94% was obtained, and the response of students obtained a value of 94.45% with very practical criteria.

Keywords: LKPD; Problem Based Learning; Hooke's Law

INTRODUCTION

The curriculum is a reference for creating good education. According to Purnadi & Surjono (2016), the curriculum provides an overview of the learning that will be implemented in each educational unit. Currently, the implementation of education in the 2013 curriculum has undergone many changes and improvements in the learning process. The learning process is no longer teacher-centered, but student-centered. The purpose of improving the learning process is to improve the quality of learning and create innovation in learning. Along with this, the role of teachers is no longer just teaching in the classroom but also required to create innovations in the learning process. One of the innovations that can be done to create good learning is to use varied teaching materials (Depdiknas, 2008).

Teaching materials are one of the important needs in the teaching and learning process, with teaching materials, learning can be carried out properly. Technically, teaching materials can be designed as a representation of the teacher's explanation in front of the class which acts as a guide for learning activities to achieve the targets and means to be achieved. Information, descriptions, and messages that should be conveyed and information that should be presented can be compiled in learning materials. According to Colin (2008), teachers must have good communication skills, namely in conveying knowledge (*expository teaching*), asking and answering student questions (*question and answer*

sessions), and leading discussions (*discussion sessions*) then also supported by using teaching materials that are suitable for students. Learning will be carried out well if it is supported by adequate learning facilities, both in the classroom and outside the classroom. Then the teacher must also be able to master the material, various methods and so on. In this case, teachers can make their own teaching materials according to the needs of students in the classroom (Musfah, 2016).

One of the teaching materials that can be used by teachers to create active learning is by using Learner Worksheets (LKPD). LKPD was chosen as the teaching material developed because LKPD is teaching material that has complete components in a concise form and is rich in student activities in learning (Sulistiyono, 2012). LKPD is very suitable to be used as teaching materials to accompany textbooks. The use of LKPD can help students increase their interest in learning, increase learning motivation and increase curiosity. Moreover, if the LKPD is prepared or made by the teacher in class according to the characteristics and needs of the students, this will make students more interested in learning. But in reality, there are still many problems related to LKPD used by several schools today, one of which is that many educational institutions buy ready-made LKPD.

The use of ready-made teaching materials such as buying LKPD is actually very unlikely because it is not in accordance with the needs of students. Their use tends to be used by teachers to simply instruct students to study on their own and do competency tests. Learning activities using LKPD, which are only in the form of answering multiple choice questions, can make students quickly become bored and lazy. Moreover, LKPD is often used only for homework, so that learning activities are only limited to practicing doing the questions available in the LKPD. The impact is that when students are at home, they do not make independent efforts in solving the problems they face, but rather look for and use instant methods so that all the problems can be answered, such as cheating, asking parents, tutors, or peers to do it. Thus, students' understanding in solving environmental problems is very lacking and finally students are only concerned with results, not processes. If left unchecked, this can foster bad character in students, such as laziness, surrender, and complacency. Students only see a problem being solved quickly without thinking about the solution process. Therefore, teachers must be able to make their own LKPD according to the needs of students in the classroom, so that in the learning process students gain knowledge by doing activities according to LKPD instructions (Prastowo, 2012).

LKPD can be used to help students in the process of learning activities in which it involves the process of science to obtain a physics concept. In physics learning, a mature understanding of concepts is needed so that students can solve problems in real life. Therefore, a learning model is needed that can support students in these learning activities. According to Ngalimun (2012), the Problem Based Learning (PBL) model is a learning model that uses problems as the first step in collecting and integrating new knowledge through the stages of the scientific method, so that students can learn knowledge related to the problem and at the same time have the skills to solve the problem.

RESEARCH METHODS

This research uses the research and *development (R&D)* method with the aim of developing *Problem Based Learning* based physics LKPD on Hooke's Law material. The development model used is the *4-D model*. The population in this study were physics teachers at MAS Plus Al-Ulum Medan and students of class XI IPA 1 at MAS Plus Al-Ulum Medan. The sample used in this study amounted to 30 students.

The data collection technique used in this study is to use non-test instruments in the form of validation assessment questionnaires by material and media expert validators, student response questionnaires and physics teacher response questionnaires. After the questionnaire is filled in by the respondents, the questionnaire data will be analyzed using the formula:

$$P = \frac{\sum f}{N} \times 100\%$$

RESULTS & DISCUSSION

1. Results

Material validation aims to determine the assessment of material on LKPD products developed as eligibility criteria. The assessment of the validation results by material experts can be seen in the following table:

Table1. Results of LKPD Material Validation Assessment

No.	Assessment Components	Assessment Percentage	Criteria
1.	Content Feasibility	72%	Worth
2.	Presentation Feasibility	80%	Worth
3.	Language Feasibility	67%	Worth
Average		72%	Worth

Based on the table above, the average percentage assessment by material expert validators on the content feasibility aspect obtained a result of 72%, on the presentation feasibility aspect obtained a result of 80%, and on the language feasibility aspect obtained a result of 67%. The average result obtained from all aspects is 72%. So it can be concluded that this achievement score gets kriteia worth using for trials but needs a lot of revision.

The assessment of the validation results by media experts can be seen in the table below:

Table2. Results of Media Validation Assessment of LKPD

No.	Assessment Component	Assessment Percentage	Criteria
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1.	Content Feasibility	80%	Worth
2.	Feasibility of Problem Based Learning presentation	80%	Worth
3.	Graphics	80%	Worth
4.	Readability	80%	Worth
Average		80%	Worth

Based on the table above, the average percentage assessment by media expert validators in the aspect of content feasibility obtained a result of 80%, in the aspect of feasibility of presenting Problem Based Learning learning obtained a result of 80%, in the aspect of graphics obtained a result of 80% and in the aspect of readability obtained a result of 80%. The average result obtained from all aspects is 80%. This shows that PBL-based LKPD on the subject of Hooke's law is included in the criteria worth using for trials but needs revision.

LKPD products that have been revised based on assessments and suggestions by material expert validators and media experts, will then be given to physics teachers. The following results of the physics teacher's response can be seen in the following table:

Table 3. Assessment Results by Physics Teacher

No.	Assessment Components	Assessment Percentage	Criteria
1.	LKPD Display	100%	Very Practical
2.	Content Feasibility	87%	Very Practical
3.	Presentation Feasibility	90%	Very Practical
4.	Linguistics	100%	Very Practical
Average		94%	Very Practical

Based on the table above, the average percentage assessment by physics teachers on the display aspect of the LKPD obtained a result of 100%, on the feasibility aspect of the content obtained a result of 87%, on the feasibility aspect of the presentation obtained a result of 90% and on the linguistic aspect obtained a result of 100%. The average result obtained from all aspects is 94%. This shows that the results of the assessment of PBL-based LKPD on the subject of Hooke's law are classified in the very practical category.

After the validation and revision stages are carried out, it is continued with the trial stage. This trial aims to determine the assessment of student responses to LKPD. The following presents the results of the assessment of student responses to LKPD in the following table:

Table 4. Results of Student Response to LKPD

No.	Assessment Components	Assessment Percentage	Criteria
1.	Interest	96,67%	Very Practical
2.	Presentation of LKPD	86,67%	Very Practical
3.	Linguistics	100%	Very Practical
Average		94,45%	Very Practical

Based on the table above, the result obtained is 96.67% in the aspect of interest, in the aspect of LKPD presentation obtained a result of 86.67%, and in the aspect of language obtained a result of 100%. The average result obtained from all aspects is 94.45%. So based on the percentage of student responses to LKPD, it shows that PBL-based LKPD on the subject of Hooke's law is classified in the very practical category.

2. Discussion

Feasibility

LKPD products are declared feasible if the products developed are adequate and all components of the products produced are in accordance with the established eligibility criteria. According to Hurriyah & Yuli Warti (2019) the validation or feasibility value is the average result obtained from the feasibility of content, suitability for learning methods in accordance with didactical requirements, suitability for construction requirements (language), and suitability for technical requirements (graphics). The validity of the LKPD developed in this study is seen based on the validation of material experts and media experts.

According to the results of the assessment obtained from the material expert, from the aspect of content feasibility, it received a score of 72%, from the aspect of presentation feasibility it received a score of 80%, from the aspect of language feasibility it received a score of 67%. So that the percentage of material feasibility from all aspects obtained a value of 72% with the category "feasible". This shows that the material contained in the LKPD is in accordance with the indicators and learning objectives. Problem-based LKPD can make it easier for students to learn and understand the material being taught. According to Wafiroh & Budijastuti (2020) the activity of formulating problems in LKPD can train students' interpretation skills. This is also in line with the opinion of Lestari & Suyoso (2018) who say that providing problem orientation to students to solve can provide maximum results and has the potential to be remembered for a long time.

Furthermore, based on the assessment of media experts, in the aspect of content feasibility obtained a result of 80%, in the aspect of feasibility of presenting Problem Based Learning learning obtained a result of 80%, in the aspect of graphics obtained a result of 80% and in the aspect of readability obtained a result of 80%. The results obtained from all aspects are 80% with the

category "feasible". The validity of the LKPD design was in line with the opinion of Muslem, et al (2019) saying that the appearance of images in LKPD can have a high influence on student interest in learning. Then it is also supported in Prastowo (2011), that the presentation of images in LKPD is needed to support and clarify the content of the material, then it can increase attractiveness and reduce students' boredom to learn it.

Based on the analysis of the assessment results above, the LKPD developed is in the appropriate category in each aspect. This is in line with Arianti's opinion (2018) that LKPDs that have scores in the valid/feasible category can form LKPDs as teaching materials that are easy to understand, so that they can make it easier for students to understand the material provided.

Practicality

The practicality of LKPD is assessed by users of LKPD, namely physics teachers and students. The level of practicality can be seen based on data from teacher responses and student responses from questionnaires that have been distributed to 30 students of class XI IPA. Based on the results of the questionnaire assessment by the physics teacher as a whole obtained a score of 94% with the category "very practical". With the LKPD display aspect obtained a result of 100%, in the aspect of content feasibility obtained a result of 87%, in the aspect of feasibility of presentation obtained a result of 90%, and in the aspect of language obtained a result of 100%. Overall, the LKPD developed has practicality criteria in the very practical category. This is in accordance with the opinion of Sukardi (2012) that the product is said to be practical if the product developed is easy to use by its users, and easy to explain by the teacher.

While on the results of students' responses, there are three aspects that are assessed, namely the aspect of interest with a value of 96.67%, the LKPD presentation aspect with a value of 86.67%, and the linguistic aspect with a value of 100%. So overall, students' responses to LKPD received an average score of 94.45% with the category "very practical". In the presentation aspect, LKPD is equipped with material and real problems to provide students with initial knowledge, initial knowledge is very influential on the learning activities that will be carried out. According to Wafiroh and Budijastuti (2020), stating that before learning begins, initial knowledge has an important role for students so that they can take part in further learning activities.

The practicality of LKPD at a very practical level is because LKPD has been accompanied by clear instructions for use and is easy for students to understand, steps on LKPD that are easy for students to understand, activities that are easy to carry out, writing language that is easy to read and understand, and accompanied by supporting material to understand students in understanding concepts. The use of images presented in the LKPD makes it easier for students to understand the material. This is in accordance with the statements of Firdaus and Wilujeng (2018) in their research that the use of clear and interesting images on LKPD can facilitate students in understanding learning materials. Then it is also reinforced by Hidayah, et al (2020) who say that learning devices are said to be practical if teachers and students use learning devices that are easy to use.

CONCLUSIONS

Based on the discussion and formulation of existing problems, it can be concluded that:

1. The feasibility level of *Problem Based Learning-based* Learner Worksheet (LKPD) on the subject of Hooke's law as teaching material for high school students is declared "feasible" to be used in learning based on 72% material expert assessment and 80% media expert assessment.
2. The level of practicality of the *Problem Based Learning-based* Learner Worksheet (LKPD) on the subject of Hooke's law is measured based on the physics teacher's response and the students' response to the LKPD. Based on the physics teacher's response, the LKPD was declared very practical with a percentage of 94%. And based on the response of students, LKPD is declared very practical with a percentage of 94.45%.

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