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Validity and Practicality of Problem Based Learning (PBL) Model Learning Tools to Improve Students' Conceptual Understanding

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Abstract

This study aimed to develop a valid and feasible problem-based learning tool to improve students' conceptual understanding. This research is a development research using the 4D model. In addition to developing science teaching materials, this research also develops syllabus, lesson plans, and concept understanding instruments. This research was conducted in one of the SMPN Lombok Timur. The validation of learning products was carried out by three validators, media experts and material experts. Expert validation data analysis was carried out using the Pearson validation formula. The results of the feasibility study of integrated student worksheet obtained an average value of 80.6% with very valid criteria. The syllabus got an average score of 77.8%, lesson plans got an average score of 78.2%, and the instrument got an average score of 78%. The average learning tools got an average score of 78.75%. The results of practicality obtained an average practicality of the teacher and student questionnaire responses of 78.75%, while the learning implementation sheet was 77.66%. In conclusion, problem-based learning model learning tools were valid and practical to improve students' conceptual understanding.

Keywords: Validity; Practicality; Problem-based learning; learning tools; conceptual understanding

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INTRODUCTION

Education plays a very important role for the development of a nation (Pachauri & Yadav, 2014; Bhardwaj, 2016). Various efforts have been made by each country to improve the quality of its education. One of them is regarding the mastery of students' concepts of the material being taught. Mastery of concepts in education is needed to produce new ways that contribute to improving the quality of learning (Susbiyanto, et al., 2019). It is important for students to have mastery of concepts because as the ability of students not only to understand, but also to be able to apply the concepts given in solving a problem, and to understand new concepts (Dewi & Primayana, 2019).

The activeness of students in the learning process is strongly supported by the use of effective devices in improving learning outcomes and in the learning process spurring the performance of the students' brains (McKnight, et al., 2016). Understanding of each material concept becomes the foundation for students to hone critical thinking skills (Carnow, et al., 2020).

Therefore, in increasing student activity, the use of devices such as student worksheets needs to be used as reference material in mastering concepts in more depth and providing real questions or problems that can train critical thinking skills. Students are not only required to learn independently by memorizing every available information, but there is motivation in

processing the information so that it is easy to understand. Students need to be directed to train their brains to think in order to be able to develop the information they have obtained.

This PBM is a model that presents real problems in everyday life related to the subject matter presented in a complex manner so that it can train students to think analytically, learn to identify the root of the problem or the source of the main problem that has an impact on the emergence of other problems. Learning activities like this help students improve their critical thinking skills (Kaharuddin, 2018).

Some research results that underlie the use of the model can improve students' conceptual understanding and critical thinking skills, namely the results of research from Sudarman & Silaban (2015) stating that the PBM model can improve students' cognitive levels and students' basic skills in science learning. Rosnanda, et al., (2018) concluded that classes using problem-based modules had better learning achievements and students' critical thinking skills increased.

This research is motivated by the low ability to understand concepts of students and there are still many teachers who have difficulty in developing learning tools with learning models that are in accordance with the demands of learning the 2013 curriculum. This is also evidenced by the low value of student learning outcomes. Learning outcomes affect students' mastery of concepts. The higher the mastery of students' concepts, the higher the learning outcomes (Yustiqvar, et al., 2019). The results of observations and interviews with teachers and students at SMPN Lombok Timur that the understanding of students' concepts in science material is still very lacking, this is indicated by the difficulty in digesting every material explained by the teacher because in its delivery it is considered less interesting. Students only listen to the teacher's explanation, answer questions and practice questions. Another factor is that there is a wrong understanding of the concept for students, for example, students have difficulty in classifying existing concepts. According to Rahim (2020) this happens, because students tend to memorize concepts and really don't understand the concept. Practical activities only direct students to understand the material in a simple way by filling out practicum worksheets without training students in making practicum work reports and evaluating practicum results. This way of learning causes students to be less actively involved in the process of finding and understanding concepts and less trained in using their critical thinking skills (Sudirman, et al., 2019).

Mastery of students' concepts in learning is needed to understand such meanings as being able to express a material presented in a form that is easy to understand, able to provide interpretation and be able to apply it. Efforts to improve the ability to understand concepts can be built with a learning model and learning tools that present innovations using problem-based learning models to maximize students' thinking processes (Ihsani, et al., 2019). Yustiqvar, et al (2019) explains that student-centered learning will make students' mastery of concepts better.

The learner-centered learning model is a problem-based learning model. Problem-based learning models have a positive effect on student learning outcomes (Susilo, 2012; Redhana, 2012; Gayatri, et al., 2013). This is because the problem-based learning model is a learning that involves students in the learning process and uses problems as the focus of learning (Reta, 2012). This study aim to develop valid and practical problem-based learning tools to improve students' conceptual understanding.

METHOD

This research is included in research and development, namely research that is used to produce certain products (creations), and test the effectiveness of these products (Sugiyono, 2017). The product in question is a learning device using a problem-based learning model to improve students' mastery of concepts. The development of biology learning tools in this study refers to the 4D development model, namely Define, Design, Development, Disseminate (Thiagarajan, et al., 1974).

The developed biology learning device product was validated by three teams of biology learning experts. Validation data from experts was analyzed qualitatively as input to improve the product being developed. Questionnaire data regarding expert responses related to the feasibility of developing products were analyzed by transforming the average value of all observed aspects into qualitative sentences with criteria. The feasibility of learning tools was analyzed based on the responses of students and educators to the use of biology learning tools, as well as the implementation of learning.

Data on the validity of the PBM learning device from the validator was then calculated using the percent validity formula. Practicality data were analyzed using the percent validity formula.

RESULTS AND DISCUSSION

The feasibility test of learning tools consisting of syllabus, lesson plans, LKPD and concept mastery instruments was validated by 3 expert lecturers. The results of the feasibility test are presented in Table 1.

Table 1. Results of the Validation of Learning Tools

No	Device	Average (%)	Criteria
1	Syllabus	77,8	Valid
2	Lesson Plan	78,6	Valid
3	Student Workshet	80,6	Valid
4	Concept Understanding instrument	78	Valid
	Average	78,7	Valid

Table 1 shows the average percentage value of the validity of the developed device is 78.75% with valid and feasible criteria for use in learning. Furthermore, an analysis of the practicality of biology learning devices was carried out which was obtained from the responses of educators and students as well as the implementation of learning. The results of the responses of students and educators are presented in Table 2, while the results of the implementation of learning are presented in Figure 1.

Table 2. The results of the responses of educators and students to the use of learning tools

No	Respondent	Average (%)	Criteria
1	Teacher	93,8	Very Practical
2	Student	96,6	Very Practical
	Average	78,7	Very Practical

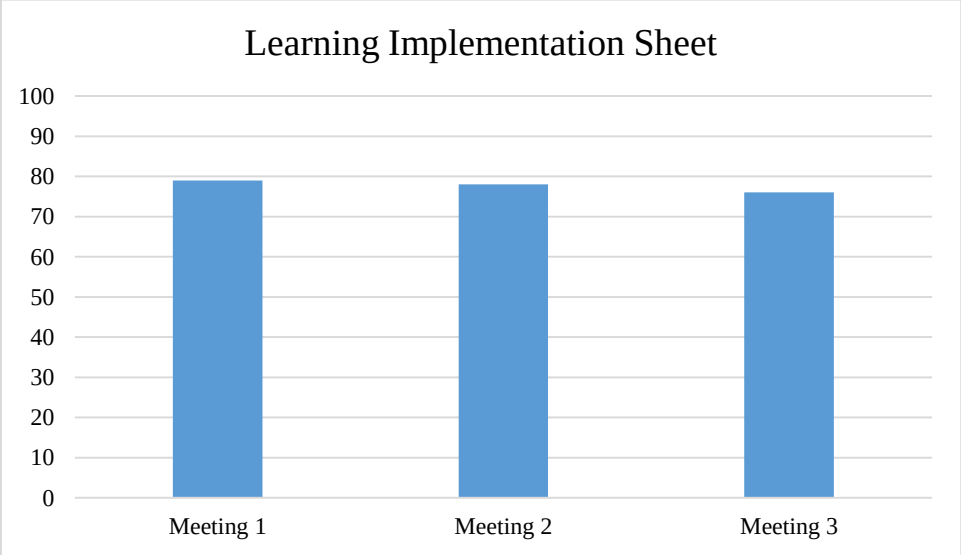

Figure 1. Implementation of Learning

Figure 1 shows that the average presentation of learning outcomes is 78% in the very practical category. These results indicate that learning by using learning tools that have been developed can be carried out well. Based on the data from the practicality analysis, it was found that the average value of each aspect of the practicality assessment was 79%, 78% and 76% with practical criteria. Practicality data shows that learning using the developed learning tools provides a positive response for teachers and students as well as for the learning process in the classroom, so that it is practical and feasible to use in the learning process, especially on environmental pollution material. A model is said to be practical if the learning phases can be implemented by the teacher properly (Siswanto, et al., 2018). This is in accordance with the results of the researcher's observations during the learning process, all phases of learning activities using the integrated PBM model of Islamic values can be carried out well, although there are some activities that are not carried out properly in accordance with the lesson plans.

The implementation of learning from the first meeting with the next meeting has an increasing percentage of implementation. This is because at the first meeting the learning is still rigid. Teachers are still not familiar with the developed learning syntax so that in practice the teacher still reads the RPP used in the learning process and requires more time allocation in its implementation. In addition, there are several learning phases that are not implemented so that the percentage of learning implementation at the first meeting is lower than the percentage value at the next meeting.

Furthermore, at the second meeting the percentage was 78% with a very practical category. At this meeting notes from the observer showed that there were 3 learning activities that were not implemented and the time spent exceeded the allotted time, which was 10 minutes, this was because the teacher forgot the stages of learning activities listed in the lesson plans. This indicates that the teacher is not familiar with the learning activities developed by the researcher. At the first and second meetings the time allocation was not in accordance with the implementation of learning this was due to the core activities, namely during the practicum and presentation, the time used exceeded the specified time, causing the time allocation used to be not in accordance with the time allocation specified in the lesson plans.

However, when viewed based on the responses of students in the learning process, they looked enthusiastic during practicum, discussion and presentation. Moreover, when the teacher presents the verses of the Qur'an related to the learning material, the students look very enthusiastic in listening to the teacher's delivery.

The interest of students in practicum activities can be seen from the activeness of students in practicum activities. In the discussion and presentation activities, students were seen to be very active in asking questions and expressing opinions and rebuttals to differences of opinion between one group and another.

Based on the student response data contained in Table 2 shows the acquisition of a score of 78.76% with a very practical category. This shows that students are very interested in practical activities. Practical activities are presented in LKPD which are compiled based on the PBM model and then implemented through learning so that they attract interest and have a positive level of assessment for students because these practicum activities are different from previous (conventional) learning.

Activities in problem-based worksheets can train students to think at a higher level, analyze a problem and find a solution. This fulfills the inquiry principles contained in the problem-based learning model proposed by Nurliani, et al., (2016) namely: (1) there is a link between content and context of experience in the real life of students; (2) Activities carried out through investigations; (3) activities are directed at students' efforts to compare hypotheses, process data, and generalize; (4) Investigation activities are carried out in small groups.

Investigation activities carried out by students during practicum indirectly practice inquiry, train critical thinking, carry out scientific methods and build new knowledge. This is

in accordance with the statement that investigative activities can facilitate students to practice and compile information and apply concepts so that understanding concepts and thinking skills are getting better (Ardianto & Rubini, 2016). Furthermore, this statement is supported by the opinion of Simamora dan Saragih (2019) which states that students integrating new concepts with previous knowledge in the environment can provide problem solving and improve thinking skills.

CONCLUSION

The problem-based learning tools that have been developed are valid and practical to use in learning to improve students' understanding of concepts.

RECOMMENDATION

The problem-based learning tools produced can be an alternative learning model applied by teachers in teaching science subjects.

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