

DEVELOPMENT OF SCIENCE

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DEVELOPMENT OF SCIENCE LEARNING SET USING THE PROBLEM BASED LEARNING (PBL) MODEL IN ENVIRONMENTAL POLLUTION MATERIALS IN GRADE VII SMP NEGERI 5 JOMBANG IN 2018

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Abstract

This research aims to overcome the problems which faced by the teachers and students is how teacher develop quality of learning tools that guide students in solving problems for learning science. The quality of learning with Problem Based Learning model is determined based on validation, practicality, and effectiveness. Validity is obtained based on the result of validity by the experts, practically is obtained based on the implementation of student learning and effectiveness is obtained based on the students' posttest score. The development model used is the ADDIE model (Analyze, Design, Development, Implement, Evaluation). The results of this research showed that the learning tools by PBL model obtained of validation with the acquisition of an average score of 3.7 with very valid category, the implementation of learning reached 8.4 % with very practical category, students responses reached 97.6% with positive responses and students learning outcomes were known from mastery learning based on KKM reached 84.3 with very effective category. Based on these results it could be concluded that the Development of learning tools with Problem Based Learning model for class VIII on Environmental Pollution was stated qualified to be used.

Keywords: Learning Tools, Problem Based Learning, Environmental Pollution

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INTRODUCTION

The implementation of the 2013 curriculum runs well if the learning process always integrates the attitude or affective, cognitive, and psychomotor domains. Science has dimensions of scientific attitude, scientific process, and scientific product, in the form of knowledge (Kemendikri, 2011: 1). Therefore, the successful implementation of the 2013 curriculum is not only influenced by the learning process which requires teachers to always be creative in developing the methods used but the availability of learning tools is also important in supporting the science learning process.

Based on the results of the questionnaires distributed to the students on March 1, 2018 at SMP Negeri 5 Jombang, as many as 66.6% of students stated that teachers often do lecture or explaining in front of the class so that students feel bored with science learning. Furthermore, 33.3% of students considered environmental pollution subject is difficult because the teacher never teaches them to observe the environment directly, although these concepts should have been easier to understand if learning was carried out by direct observation. As many as 86.6% of students use textbooks more often in learning. As many as 83.3% of students stated that it was easier to understand learning by practicing directly by giving real problems to make it easier to understand and learning activities to be more active and enjoyable. Lastly, as many as 76.6% of students considered that learning science was difficult and boring in science learning because teachers often use conventional methods.

The seventh-grade science teacher stated that the minimum completeness criteria (KKM) of the science subject at SMP Negeri 5 Jombang was 80, but there were still many students had not reached the KKM. In Science Subjects, especially Biology, many students think it is easy, but in fact out of 30 students, only about 5 students whose scores reach the KKM. The learning activities carried out by the teacher have several problems, for example: the limited learning tools that are in accordance with the 2013 curriculum; the lack of well-prepared science lesson; lack of variation; lack of student's involvement in asking questions, expressing opinions, or developing opinions; learning with environmental exploration is also rarely done. Learnings are more often conducted teacher-centered, as the result the students' critical thinking skill in identifying and solving problems, making hypotheses, making conclusions, and developing opinions are still low.

One of the solutions to overcome the problems faced by teachers and students is how teachers develop learning tools that guide students in solving problems in science learning. According to Marsigit (2011: 9) There are three roles of teacher: as a facilitator, teaching resources and monitoring student

activities. The development of learning tools is carried out so that learning becomes effective, efficient, and does not deviate from the competencies to be achieved. Teachers should develop learning tools that are in accordance with the conditions and needs of students. Seeing these conditions, authors develop learning tools using the Problem Based Learning (PBL) model.

Based on this background, study with the title "Development of Natural Science Learning Devices Using the Problem Based Learning (PBL) Model in Environmental Pollution Material for Class VII SMP Negeri 5 Jombang in 2018" was conducted. The purpose of this study was to develop learning tools using the Problem Based Learning model on the material. Environmental Pollution for Class VII SMP based on ADDIE development procedures.

METHOD

The research design used is One-Shot Case Study based on Pre-Experimental in research on the development of learning tools. This study includes the type of development research. Development research is research that aims to develop products and determine the quality of the products that have been produced. The product of this research is a PBL based lesson plan, student worksheet and assessment instruments for 7th grade class of junior high school (SMP) in environmental pollution topic. Development of this media uses the ADDIE development model developed by Dick and Carrey (Tegeh, 2014), which consists of five stages of development: Analyze, Design, Develop, Implement, and Evaluate.

The subjects of the trial for the implementation of the use of this learning device were 32 students of class VII-D of SMP Negeri 5 Jombang in the 2017/2018 school year. The data collection methods used in this study were tests (cognitive test questions) and non-tests (observation and questionnaires). The instruments used were the learning device validation sheet, the PBL learning implementation observation sheet, the posttest question sheet, and the student questionnaire.

The data analysis technique carried out in this study used the analysis of the validity of the lesson plans and assessment instruments, student worksheets material, the implementation of the use of PBL model learning tools, student posttest results, and student response questionnaires.

RESULTS AND DISCUSSION

Learning tools using the Problem Based Learning (PBL) model are said to be of good quality if they meet 3 aspects: validity, practicality, and effectiveness.

Lectora Inspire learning media is said to be of quality if it meets the criteria which include: validity aspects, practicality aspects, and effectiveness aspects. Following are the results of the analysis of the validity, practicality and effectiveness as follows:

1. Validity analysis of PBL based instructional media

The process of developing instructional media with the Problem Based Learning model was revised according to the suggestions and input from 1 supervisor, a media expert lecturer and 1 science teacher at SMP Negeri 5 Jombang. The revision was carried out to determine the validity of the learning device so that it is suitable for use in the learning process. The recapitulation of the validation results can be seen in Table 1 below.

Tabel 1. Recapitulation of The Results of the Validation of Problem Based Learning Model Learning Tool Aspects

No.	Criteria	Score		Average	Category
		v1	v2		
Formulation of Learning Objectives					
1.	Conformity of learning objectives with basic competencies.				
2.	Provisions for the translation of basic competencies into learning indicators.				
3.	Kesesuaian tujuan pembelajaran dengan indikator pembelajaran.	17	19	4,5	Very Valid
4.	The suitability of indicators with the level of student development				

No.	Criteria	Score		Average	Category
		V1	V2		
Content					
1.	Lesson plan identity is complete				
2.	Clarity of lesson plans (opening, core and closing learning activity stages)				
3.	Lesson plan systematic				
	Completeness of the stages of student and teacher activities with the Problem Based Learning Model.				
	Provide problem orientation to students.				
	Organizing students to research				
	Assisting independent and group investigations				
	Developing and presenting the work (exhibit)	19	20	4.8	Very Valid
	Analyze and evaluate the problem-solving process				
4.	Completeness of evaluation instruments (questions, keys and scoring guidelines)				
Language					
1.	Use of language according to EYD				
2.	The language used is communicative	9	10	4.7	Very Valid
				4.6	Very Valid
Average score					

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Keterangan:
 $1.0 < x \leq 1.8$ = very less valid
 $1.8 < x \leq 2.6$ = less valid
 $2.6 < x \leq 3.4$ = fair valid
 V1: Nur Hayati, M.Pd

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 $3.4 < x \leq 4.2$ = valid
 $4.2 < x \leq 5.0$ = very valid
 V2: Latifah Hanim, S.Pd

The data in Table 1 shows the results of the validator's assessment of the RPP. From these results indicate that the learning device using the Problem Based Learning model gets an average score of 4.6 in the very valid category.

2. Practicality analysis of instructional media with PBL model

The practicality of learning tools is known based on the results of the implementation of the use of learning devices and student response sheets. The results of observations of the implementation of learning using the Problem Based Learning model based on the activities of students at the second meeting. From the author's analysis it is known that learning using the Problem Based Learning model of learning gets an average of 84% in the very practical category.

The results of the author's analysis show the results of students' responses to learning using the Problem Based Learning Model. It is known that as many as 97.6% of students responded positively to learning using the Problem Based Learning model with a very practical category. From the student response sheet, it is also known that comments and suggestions from students after learning use the Problem Based Learning model.

3. Data Analysis on the Effectiveness of Learning Tools with the PBL Model

The effectiveness of this learning tool can be seen from student learning outcomes, namely from the results of student completeness based on KKM and learning indicators completeness. The results of the author's analysis show that out of 32 students who worked on posttest questions only 5 students did not complete with a value of 80. With an overall average of 86.2 and completeness of 84.3. used. Completeness of learning indicators to determine the effectiveness of using learning tools using the Problem Based Learning model. shows 4 learning indicators that are measured achievement in the posttest. of the 4 learning indicators which consist of describing environmental pollution which is declared complete with 95% completeness, describing water pollution is declared complete with 89.3% completeness, describing the causes and impacts of water pollution declared incomplete with 76.8% completeness and determining how to make a purification tool simple water was declared complete with 86.2% completeness. Of the four indicators there are 3 indicators that are complete and 1 indicator that is incomplete, namely the 3rd

indikator¹⁵ The overall average number of learning indicators completeness is 86.8%.

Based¹¹ the description above, it can be concluded that the learning device using the PBL model developed has valid, practical, and effective qualities. This is evidenced by the results of the validation, the results of the implementation sheet, the results of student responses and the results of the posttest which all aspects have been carried out well.

CONCLUSION

³ Based on the results of the study, it was concluded that the quality of the learning tools using the Problem Based Learning model in the Class VII Environmental Pollution system material was declared to be of quality to be used in terms of validity, practicality¹² and effectiveness. Based on the results of research and discussion of some suggestions for improving the development of learning tools using the Problem Based Learning model, they are as follows: Development of learning tools using the Problem Based Learning model on Environmental Pollution material needs to be followed up so that these learning tools can be useful for schools and make it easier for science learning and produced better research results. The development of learning tools using the Problem Based Learning model on Environmental Pollution material that has been developed is expected to be used in schools¹⁰ so that students can more easily understand solving real problems. 1. The use of learning tools using the Problem Based Learning model in science learning should be done with careful preparation, especially in preparing tools and materials during practicum.

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