

Development of Student Worksheets Based on Problem Based Learning to Improve Creative Thinking Skills of Class XI High School Students



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ABSTRACT: Creativity is the result of a creative thinking process. Creative thinking refers to higher-order thinking processes, this skill is indispensable in the 4.0 revolution era because of the complexity in all aspects of modern life. One of the learning models that can facilitate students in developing their creative thinking skills is Problem Based Learning and the use of printed teaching materials, namely Student Worksheets. The research objective is to produce LKPD based on Problem Based Learning to improve the creative thinking skills of students in class XI SMA. This type of research is development research using the Plomp model. The Plomp model development phase consists of a primary research phase, a development or prototyping phase, and an assessment phase. The instruments used are validity assessment sheets, practicality assessment sheets and essay questions to assess their effectiveness. The results showed that the LKPD based on Problem Based Learning was very valid with a value of 83.25% based on the validation carried out by the validator. The results of the practicality assessment by the teacher showed a value of 94.17% with very practical criteria and the results of the practicality assessment by students getting a score of 87.52% with very practical criteria. The results of the effectiveness test showed that based on the N-Gain Score test conducted in the experimental class, the score was 0.71 in the high category, while the control class scored 0.48 in the medium category, while based on the hypothesis test, it was found that the use of problem-based worksheets was Based Learning is effective in improving students' creative thinking skills. So it can be concluded that the Problem Based Learning-based worksheets that have been developed are very valid, very practical, and effective..

KEYWORDS: Problem Based Learning, Creative Thinking, Biology

INTRODUCTION

21st Century Learning is an era dominated by knowledge of brain development, science learning in the 21st century, to prepare students to have creative, innovative, critical thinking, problem solving, communicative, collaborative, ICT literacy and leadership skills [1]. Creativity is the key to all competencies because by using creativity an individual can make something better or even new. Creativity is the result of a creative thinking process. Creative thinking refers to higher-order thinking processes, because these skills are very much needed in the 4.0 revolution era because of the complexity in all aspects of modern life. Students are required to not only be able to solve cognitive problems in school but also to prepare themselves to face their real life problems in the surrounding environment [2]. Creative thinking is one of the important skills in solving problems. With the increase in creative thinking skills, student achievement is also expected to increase [3]. Facing the challenges of the industrial revolution 4.0, students must have the ability to think creatively. Creativity is the skill to find new thoughts.

Creative thinking can be used in solving problems that arise in everyday life. Creativity has the power or quality to express themselves in a way that students have, so that each student is definitely different in creative thinking with the main goal being to train students to have new and creative production skills [4]. Based on the initial investigation conducted by the researchers, it can be concluded that students are passive in the discussion and question and answer process, students have difficulty in conveying new ideas/new ideas during the learning process and the LKPD used during learning in schools is not yet based on Problem Based Learning and training. creative thinking skills of students. One way that can overcome this is by using teaching materials, one type of printed teaching material is LKPD (Student Worksheet. LKPD helps students understand the material and can improve students' creative thinking skills [5].

One alternative that can improve students' creative thinking skills and self-confidence is through the development of Problem Based Learning (PBL) devices with a Scientific Approach. The learning process with the Problem Based Learning (PBL) model is a learning

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model that presents real problems that exist around students to be investigated authentically by students [6]. Learning using the Problem Based Learning learning model is student-centered and encourages inquiry, and free thinking, the whole teaching and learning process oriented to Problem Based Learning helps students become independent. The main role of the teacher in Problem Based Learning is to guide or facilitate, so that students can develop critical thinking skills and be able to solve problems effectively. The Problem Based Learning Model was developed primarily to help students develop thinking skills, problem solving and intellectual skills [7]. Problem-Based Learning was chosen because (1) it relates problems to real life (2) encourages students to play an active role in learning activities, (3) encourages the use of various learning approaches, (4) provides opportunities for students to make choices and effective learning methods (5) encourage learning with other students, and (6) achieve quality education. In Problem Based Learning, students work in small groups and can identify what is given to solve problems [8].

From the description that has been described previously, the authors are interested in conducting research on "Development of Student Worksheets Based on Problem Based Learning to Improve Creative Thinking Skills of Class XI High School Students.

RESEARCH METHOD

The type of research conducted by the researcher is Research and Development which is used to produce LKPD based on Problem Based Learning. The development model used in this study is the Plomp model. The model consists of three phases: 1) Preliminary Investigation research (preliminary phase). 2) Prototyping or manufacturing development (development or prototyping phase), and 3) Rating (assessment phase) [9]. The population in this study were students of class XI MIPA SMA Negeri 2 Padang registered in the 2020/2021 academic year. Sampling was done by using purposive sampling technique. Self Evaluation and One To One testing is carried out using a checklist, this test is carried out to see the completeness of the Problem Based Learning-based LKPD components that have been developed, then the validity test analysis and practicality test use descriptive statistics. First, the data was compiled using a label scale. Validity data analysis includes aspects of ease of use, aspects of time efficiency, aspects of ease of interpretation and equivalence with existing learning resources. All items are scored and the percentage is determined by the formula [10]:

Validity Value = (Total Score obtained) / (Total highest score) x 100%

0-20% = Invalid

21-40% = Valid

41-60% = Quite Valid

61-80% = Valid

81-100% = Very Valid

The assessment of the practicality of LKPD based on Problem Based Learning in this study was obtained from the small group test, large group test and the assessment of biology subject teachers. The result of the percentage assessment is determined by the formula [10]:

Practicality Score = (Total Score obtained) / (Total highest score) x 100%

0-20% = Impractical

21-40% = Less Practical

41-60% = Quite Practical

61-80% = Practical

81-100% = Very Practical

In the effectiveness assessment stage, the researcher assesses the creative thinking skills of students as an effectiveness variable. The researcher used a Randomized Control Group Pretest-Posttest design. The assessment was carried out by pretest and posttest in the control class and experimental class using 9 essay questions that had been tested for validity, discriminating power and level of difficulty using anates. The experimental class is a class that conducts learning using LKPD-based Problem Based Learning that researchers have developed, while the control class uses LKPD which is commonly used by teachers in schools.

The learning outcomes data were then tested for normality and homogeneity using SPSS version 17 software. Furthermore, the pretest and posttest data for students' creative thinking skills were calculated using the N-Gain Score test with the formula [11]:

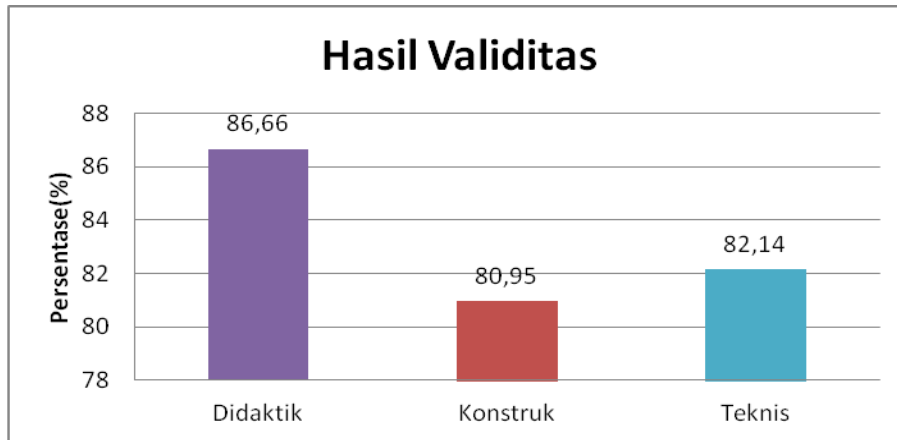
N-Gain Score = (posttest score - pretest score) / (ideal score - pretest score)

After testing the N-Score, then hypothesis testing is carried out using the Independent Sample T-Test using SPSS 17 software.

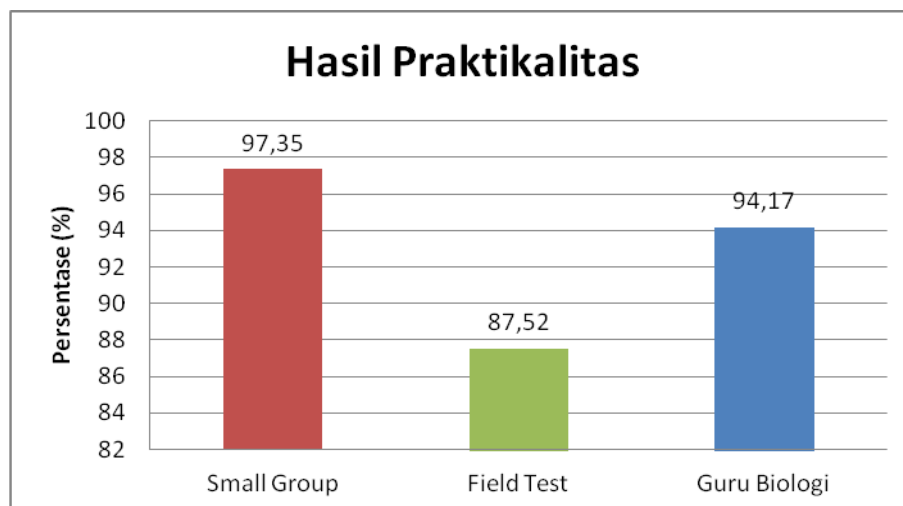
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RESULT AND DISCUSSION

The average results of the validity by experts in the very valid category with an average of 83.25%, while the percentage of each assessment aspect consisting of didactic aspects, construction aspects and technical aspects can be seen in the diagram below:



The results of the Small Group test, the Field Test and the practicality test for Biology teachers are in the very practical category. The results of the percentage of practicality assessment can be seen in the diagram below.



The assessment of students' creative thinking skills was obtained from the results of the Pretest and Posttest. The results of the Pretest and Posttest can be seen in the table below:

Table 1. Summary of the Values of Students' Creative Thinking Skills

Class	Uji	Sampel	xmin	xmax	\bar{X}	N-Gain Score
Exsperiment	Pre Test	36	54	70	63,6	0,71
	Post Test	36	84	97	89,5	
Control	Pre Test	36	54	69	61,6	0,48
	Post Test	36	71	90	80,2	

Normality test in the experimental class and control class has a significance value greater than 0.05. This shows that the creative thinking skills test is normally distributed. The homogeneity test of students' creative thinking skills with a significance greater than 0.05, this indicates that the results of students' creative thinking skills have a homogeneous variance. The N-Gain Score test of students' creative thinking skills got a score of 0.71 with a high category in the experimental class while in the control class the N-Gain Score test got a value of 0.48 with a medium category. Hypothesis testing was carried out with Independent sample T-Test using SPSS 17. The results of the Independent Sample t-test showed the value of Sig. equal to $0.000 < 0.05$. It can be concluded that there is a significant

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difference in students' creative thinking skills between the experimental class using LKPD based on Problem Based learning and the control class using LKPD which is commonly used in schools. Based on the effectiveness test conducted, it was found that problem-based learning applied in chemistry learning at school has a positive effect on increasing students' interest in learning and creative thinking skills of students [12]. [13]

The use of LKPD based on Problem Based Learning has an effect on students' creative thinking skills. Student worksheets oriented to problem based learning can train and improve students' creative thinking skills [14]. The results of the validity carried out by the validator obtained an average value of 83.25% in the very valid category. This shows that the Problem Based Learning-based worksheets that the researchers developed can be used as printed teaching materials by teachers because they meet the criteria from the didactic, construct, and technical aspects.) Validation refers to the accuracy, meaning and usefulness of something that the researcher makes [15]. The test results in the small group obtained an average of 97.35% in the very practical category. , the large group test obtained an average of 87.52% in the very practical category and the practicality test on teachers obtained an average of 94.17% in the very practical category. Practicality refers to aspects of ease of use, time required, ease of interpretation and equivalence with existing learning resources.

IV. CONCLUSIONS

Based on the results of the development of LKPD based on Problem Based Learning, it is found that: 1) LKPD based on Problem Based Learning that has been developed has validity with a very valid category. 2) Problem Based Learning-based worksheets that have been developed have validity in the very practical category. 3) Problem Based Learning-based worksheets that have been developed are effective in improving students' creative thinking skills.

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