THE EFFECTIVENESS OF PROBLEM BASED LEARNING STUDENT WORKSHEETS ON STUDENT LEARNING OUTCOMES

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Abstract

This research aims to determine the effectiveness of Problem Based Learning (PBL) based LKPD on the learning outcomes of class XI students. This research was conducted at SMA Ihsaniyah Tegal City with advanced statistics material. The research subjects used in this research were class XI as many as 62 students. The type of research used in this research is quantitative using an experimental class and a control class using evaluation tests. The learning results show that there is a level of effectiveness of Problem Based Learning-based LKPD with an average score of the experimental class of 83.5% while the control class only achieved an average score of 60.4%. Students experience increased learning outcomes in advanced statistics material

Keywords: LKPD, Problem Based Learning, Hasil Belajar

1 INTRODUCTION

Education is a humanization process, which means that without education humans will not become humans in the true sense (Noviani et al., 2017). One of the subjects that has an important role in the education unit is mathematics (Sholihah & Mahmudi, 2015; Rofii et al., 2018). Mathematics is a science that discusses patterns and levels (Siagian: 2016). Mathematics education is centered on students in developing problem solving (Mulyono, et al (2018)

There are 3 learning outcomes in terms of ability, namely cognitive, psychomotor and affective. When you have studied, an assessment of the material presented will be carried out. The domains of ability that are dedicated are these 3 domains. Where students can take evaluation tests in accordance with the material being studied. In the results of previous research, it can be seen that the majority of students experience problems during learning. One of them is in the cognitive domain, students' cognitive thinking abilities can be influenced by the intake of macronutrients which support brain development and learning carried out innovatively and in interactions which greatly influence students' learning outcomes (Istiani)

The Problem Based Learning (PBL) model is learning that begins with real problems that occur in accordance with the material being studied so that it trains students to increase their skills in solving problems and thinking critically in solving a problem (Nofziarni, 2019). The problem-based learning model has been proven by several researchers to have a positive effect and make learning more meaningful so that it can improve problem-solving abilities and students' learning outcomes (Supiandi, 2016). So the use of the problem based learning model can help students prepare data and sort their knowledge related to social problems and environmental factors to expand important information and create student-centered learning.

LKPD is a type of printed teaching material that contains an outline of the material, guidelines and instructions for completing learning tasks that students need to complete to develop their abilities related to certain basic skills (Riadi, 2022). In the LKPD there are materials, tasks and procedures that students need to carry out in participating in learning activities. LKPD can be directed so that students can solve problems that occur and through LKPD students can determine the structure, abilities and perspective of students (Regita, 2020). The use of LKPD media can also make it easier for teachers to guide the learning carried out, forming students' interest in more innovative learning. Things that are taken into consideration in developing PBL-based LKPD are that the use of PBL-based LKPD has been proven to improve student learning outcomes.

According to Mr. Hanifathul Hidayat, S.Pd., as a mathematics teacher for class XI Ihsaniyah, Tegal City, the teaching tools used in statistics material are teaching modules and books. The book used is a mathematics package book for class

This research was conducted to show that student learning outcomes increase by using PBL-based LKPD. Based on the description above, this research aims to determine the use of PBL-based LKPD to improve student learning outcomes.

2 METHOD

This research was conducted with two sample classes, namely the experimental class and the control class. The experimental class was treated with learning using PBL-based LKPD, while the control class used conventional-based LKPD. The population in this study was class XI SMA Ihsaniyah Tegal City, totaling 62 students. The assumption used is that students with the lowest average learning outcomes can improve using PBL-based LKPD. For that class, the one with the low average is the control class and the class with the high average is the experimental class. To collect data, use PSTtest questions on learning outcomes in advanced statistics material. The data analysis used in this research is (1) prerequisite analysis tests in the form of normality and homogeneity tests, (2) one-way right proportion test, (3) One-way Manova Test, (4) Hotteling Test.

3 RESULTS

The research results were obtained using instruments in the form of posttest questions and observations on advanced statistics material. After the posttest questions were given, the researcher carried out calculations assisted by Excel to obtain conclusions about the effectiveness of the PBL-based LKPD following the steps taken:

1. Analysis Prerequisite Test

   As a requirement for conducting hypothesis testing to show product effectiveness, the data obtained, namely posttest question data for the experimental class and control class, must meet the assumptions, namely normal and homogeneous.

   a. Normality test

      In this research, the data obtained was analyzed using Microsoft Excel, namely the normality test for the experimental class and control class, presented in table 1.

Tabel 1. *Hasil Normalitas*

No	Variabel	N	L_{hitung}	L_{tabel}	Kesimpulan
1	Eksperimen	34	0,129	0,1519	Normal
2	Kontrol	29	0,011	0,161	Normal

      Table 1 shows that the significance values for the posttest questions in the experimental class and control class are normally distributed.

   b. Homogeneity Test

      A homogeneous test was carried out for posttest question data in the experimental class and control class using a homogeneity test assisted by Microsoft Excel. that the significance value for the posttest questions in the experimental class and control class is homogeneous.

2. Activity Test

   a. Proportion Test one right side

      The one-way, one-right proportion test was used to analyze posttest data in this study. The proportion test hypothesis is as follows:

      $H_0 : \mu \leq 75\%$ The proportion of students whose score is <75 is not more than 35%.

      $H_0 : \mu > 75\%$ The proportion of students whose score is > 75 is more than 35%

So it can be concluded that with a significance level of 5% and $Z_{hitung} > Z_{tabel}$ or 3.6 > 1.35 then Ho is rejected, so that the learning outcomes taught using PBL-based LKPD are > 75 or exceed 35%

b. One-way Manova Test

Based on the one-way Mononova calculation test, it is obtained that $\lambda_{hitung} = 0{,}097$ The results are consulted with λ_{tabel} with a significance of 5%, then we get $\lambda_{tabel} = 0{,}903$ It turns out that if $\lambda_{hitung} < \lambda_{tabel}$ or 0.097 < 0.903, thus Ho is rejected, which means there is The difference in the success rate of student worksheets based on problem based learning and students who use conventional based student worksheets.

c. Hotteling Test

Based on the calculations obtained $\tau^2{}_{hitung} = 2880{,}42$ the results were consulted with $\tau^2{}_{tabel}$ with ρ (number of response variables) = 2, V_n (db treatment) =1 and db error = 60 with a significance level of 5% then we get $\tau^2{}_{tabel} = 6{,}413$. Because $\tau^2{}_{hitung} > \tau^2{}_{tabel}$ then Ho is rejected, which means that student learning outcomes are better when using problem based learning student worksheets than using conventional based student worksheets.

4 DISCUSSION

Based on the data analysis carried out. There is a level of effectiveness using PBL-based LKPD on student learning outcomes in class XI. This is known from the calculation of the right-hand proportion test which exceeds 35% and students get a score > 75. This is in line with previous research. Research explaining that PBL-based LKPD is able to improve student learning outcomes, where this learning model places students in real life problems to create a moving learning environment.

Thus, based on this quantitative research, it can be proven that student learning outcomes have increased through the application of PBL-based LKPD in advanced statistics material. This is because learning is student-centered, making them more active and motivated when participating in learning. Learning using PBL-based LKPD starts from specific problems of daily life into special experiences that enable students to face future life.

5 CONCLUSION

Based on the research results, it was concluded that the use of Problem Based Learning-based LKPD has been proven to be effective in improving student learning outcomes. This is because Problem Based Learning-based LKPD guides students to be proficient in solving problems as a starting point which can stimulate student learning outcomes and LKPD contains stimulation of student learning outcomes in groups.

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