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Differences in Student Learning Outcomes Through the Application of Problem Based Learning (PBL) Learning Models With and Without Using Student Worksheets (LKPD)

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ABSTRACT

This study aims to determine the differences in student learning outcomes taught using the Problem Based Learning (PBL) learning model using LKPD and without LKPD on biodiversity material in class X SMA S PAB 8 Saentis. The type of research used is quasi experiment with Nonquivalent Control Group research design. The results showed that the average student learning outcomes in the Experiment class were 81.17 higher than in the Control class with a score of 75.92. Based on the results of the hypothesis test, a significance value was obtained on the posttest data, these results indicate that there are differences in the learning outcomes of students taught using the Problem Based Learning (PBL) learning model using LKPD and without LKPD on biodiversity material in class X SMA S PAB 8 Saentis TP 2022/2023.

INTRODUCTION

The development of an increasingly modern era requires human resources to be advanced, creative and competent in various aspects. One thing that can be done is to increase educational quality. Education is one aspect that plays an important role in life. The human ability to learn is a characteristic that distinguishes it from other creatures. Education is likened to a basic need, this is because Pendidikan is the most significant aspect that can affect the existence of the country through young generations who are able to lead the nation in a better direction. The role of the national education system as defined by (Article 3 of RI Law No. 20/2003, namely developing abilities and fostering a noble demeanor and cultivating a strong national identity, the objective is to nurture the growth of students' capabilities who are possess knowledge, demonstrate piety, exhibit capability, show creativity, display independence, and take on responsibility.

Based on the description of the functions above, education must be able to maximize the abilities that exist within each student. To achieve this function is of course inseparable from the learning process including the strategies, methods, models and learning media used by the teacher in each class. However, implementing this is certainly inseparable from the reality on the ground. The problem that appears in formal education today is the lack of absorption of students, this can be seen from the average learning outcomes which are still relatively low. The current learning process places the teacher as the domination of learning and does not provide access for children to develop independently in their thinking concepts (Ilmi, 2015). This makes students unable to construct their own knowledge and less active in seeking information.

In the world of education, The achievement of an educational endeavor can be seen from the achievement called learning achievement. One of the determining factors for student learning success is the quality of learning activities. The quality of learning in the classroom is influenced by many things that are complex and intertwined with each other, for example the media and learning models used, the characteristics of the material, the psychological state of students and so on (Abas, 2012). To

enhance educational results and student activity in the classroom, a learning model is needed that involves students to think analytically, critically, productively and independently.

So far, learning activities in schools are still teacher-oriented, thus within this research, the Problem Based Learning learning model was chosen because it is seen as being able to engage students actively in the process of learning and students are directly involved in solving problems. Problem Based Learning is a model that helps students develop problem-solving skills, increases understanding, and knowledge and is active in gaining knowledge (Koeswanti, 2018). Problem Based Learning is a learning model with a sequence teaching and learning activity that focus on solving problems that actually occur in everyday life, problem-based learning models are closely related to the reality in the daily lives of students, so that in learning students experience the problems being studied and the knowledge he has acquired and is no longer dependent on the teacher.

Learning goals can be fulfilled by applying effective learning. Effective learning can take place if the teacher is capable of apply the right learning models and media. The complexity of the material to be conveyed can be simplified with the help of the media. The use of learning media can save time, reduce student misunderstandings about teacher explanations and can increase student motivation and interest in learning (Ulfatuzzahra, 2020). In this study the learning media referred to are Student Worksheets (LKPD) which are integrated with the Problem Based Learning learning model which can help students understand the subject matter they receive. According to Arsyad in Rohaeti et al. (2009), one of the learning media that can help students and teachers in the learning process is LKPD. LKPD which are sheets containing students' assignments that can help learning activities be more focused, the message to be conveyed is clearer, and can motivate students by directing students' attention so that they can learn on their own according to their abilities and make students learn independently. As said by Handayani (2013), independent learning for students is important because in the LKPD there is a summary of the material and tasks whose activities require students to learn independently, so that independence in learning can be trained. In addition, LKPD is a learning medium that is easy to implement, simple, and affordable. Presenting simple messages in LKPD is enough to help teachers as an alternative in making learning time effective when combined with the PBL learning model, so that LKPD can be used as an alternative learning media (Rohaeti et al., 2009).

Biodiversity material is closely related to natural events around. This material invites students to understand the complexity of the diversity of living things and efforts to maintain biodiversity. In the concept of biodiversity, problems can be raised to be solved in learning. Biodiversity material contains real problems in life (authentic) and is ill structured problem, so Problem Based Learning is appropriate to apply to this material. Problem-based activities can demand and stimulate students to use their thinking skills to solve problems (Widayati, 2020). So that in teaching, this material is suitable for using the Problem Based Learning learning model with the help of LKPD as a support for students in understanding the material. Derived from the outcomes of the conducted observations made at SMA S PAB 8 Saentis through interviews with a Biology teacher, information was obtained that the Problem Based Learning model have never used in biodiversity material so that research could be carried out using this model. In addition, learning tends to be centered on the teacher (Teacher Center). In connection with the use of LKPD, some teachers very rarely use LKPD in their learning process. LKPD only contains questions so that it seems only to answer questions. LKPD is also not used in the core of learning. In the studying process, the teacher tends to use the lecture method, although sometimes he also uses the question and answer and discussion method but still focuses on teaching and learning activities to the teacher. This causes these students to only receive information in the form of notes that are monotonous or by working on questions given by the teacher so that students tend to get bored, students tend to only wait for presentations from the teacher without any effort to find or find themselves, students tend to be lazy to ask questions in the studying process, so that the ability of students to understand the material is not optimal. This affects the learning interest of students so that it has an impact on the completeness of students who are still below the KKM. Biology subject for class X is 75. To improve learning outcomes and also the activeness of students in the classroom, learning models and media are needed which engage students in a more active role within the teaching and learning process, leading to potential enhancements in student learning results. Where the researcher introduces the Problem Based Learning learning model assisted by Student Worksheets.

Research related to the PBL learning model, namely Atikasari (2012), at SMA Negeri 1 Ambarawa regarding the effect of the Problem Based Learning approach in Environmental Pollution material on Analytical Ability. The results obtained show that implementation of problem-based learning is high, reaching (81.1%). This learning have a significant impact on students' analytical abilities. From these results a deduction can be made that application of problem-based learning has a positive effect on students' analytical abilities. The results of another study by Utomo, et al (2014) concerning the Effect of the Problem Based Learning Learning Model on Concept Understanding and Thinking Ability of Class VIII Odd Semester Students of SMPN 1 Sumbermalang Situbondo TA 2012/2013 stated that Problem Based Learning had an effect on students' understanding of concepts with a significant value of 0.000 (<0.05). The increase in the initial assessment before and after averages is 21.36 from the pre-test average of 52.45 to the post-test average of 73.81. The results of another study by Herti (2017) regarding Comparison of Student Learning Outcomes in the Use of Problem Based Learning Learning Models by Using Student Activity Sheets (LKS) said that the results of the study showed that the average learning result in the Experiment class was 89.78 while the average learning result control class of 85.89. Within the Experiment class there was a rise of 32.84% while in the Control class it was 28.5%. Thus it can be said that the Problem Based Learning learning model with LKPD has a good influence on improving learning outcomes. Be based on the description above, researcher feels extracted in conducting inspect related to the differences in learning outcomes of students who use LKPD and without LKPD with problem based learning . The problem being studied is whether or not there are differences in learning outcomes using LKPD and without LKPD with the PBL model on biodiversity material. Based on these problems, the aim of this research was to find out the differences in learning outcomes of students who took part in the PBL model learning with and without using worksheets on biodiversity material in class X SMA S PAB 8 Saentis.

RESEARCH METHODS

This type of research is a quasi-experimental research with The Nonquivalent Control Group research design . The research was designed by conducting a pretest and posttest to measure learning outcomes for the material being taught. The research design can be seen in table 1:

Table 1. Research Design

Class	Pre-test	Treatment	Post-test
Experiment Class I	Y_1	X_1	Y_2
Experimental Class II	Y_1	X_2	Y_2

Information ;
Y_1: Pre-test (preliminary test before being given treatment).
X_1 : Learning by using *Problem Based Learning* models use LKPD.
X_2: Learning by using the *Problem Based Learning* models without using LKPD.
Y_2 : The value of *the posttest* (final test) after being given treatment .

On research, pretest and posttest will be given . Provide a pretest to the initial abilities of students, then carry out learning activities where the Experiment class uses LKPD and the Control class does not use LKPD, then a posttest is carried out to measure student learning outcomes after learning. The values obtained in the Experiment class and Control class will be compared by testing the hypothesis using the SPSS program with the Independent Sample T-test statistic. The population in this study were all class X students of SMA S PAB 8 Saentis TA 2022/2023 consisting of six classes, with a total of 130 students, the sampling technique used was the Purposive Sampling technique . The sample to be used in this study is Class X-1 as the Experiment class and Class X-2 as the Control class. Data collection techniques in this study are documentation and test methods. The tests in this study were in the form of multiple choice questions that were used for the pretest and posttest , before the test questions were given to the experimental class, the validity of the questions was tested in the following stages:

Test Validity Test

The method used in the validity test is product moment correlation using the SPSS 20 application. To determine the level of validity, a significance test is used by comparing the r_hitungcalculated value with the value r_tabelwith a significance level (α) = 0.05, r_tabelfor N = 32 is 0.349. Of the 30 questions tested, there were 25 valid questions and 5 invalid questions.

Reliability Test

The results of the reliability test used in the research instrument trials found that the value of r count = 0.872 and the value of r table = 0.349. Because r count > r table (0.872 > 0.349), it can be concluded that the question is declared reliable with a very high category.

Problem Difficulty Level

As for the results of the calculation of the difficulty level of the questions, there are 6 questions in the easy category, 23 questions in the medium category and 1 item classified as difficult.

Different power Problem

The results of the calculation of 30 questions, it is known that there are 5 questions classified as bad, 16 items classified as sufficient, 9 items classified as good.

RESULTS AND DISCUSSION

***Pretest* and *Posttest* Learning Outcomes**

The test given is an objective test, which has been carried out and got the results, the results obtained from the pretest in class X-1 the lowest score is 28 and the highest score is 60, in class X-2 the lowest score is 24 and the highest score is 56. After learning , at the end of learning given a posttest to determine the final ability level of students. The results of the posttest in the Experiment class, namely class X-1, found that the lowest score was 68 and the highest score was 92 and the posttest results for the control class, namely class X-2, obtained the lowest score, namely 68 and the highest score, namely 88. The mean value of pretest and posttest Experimental class and Control class are described in the following diagram:

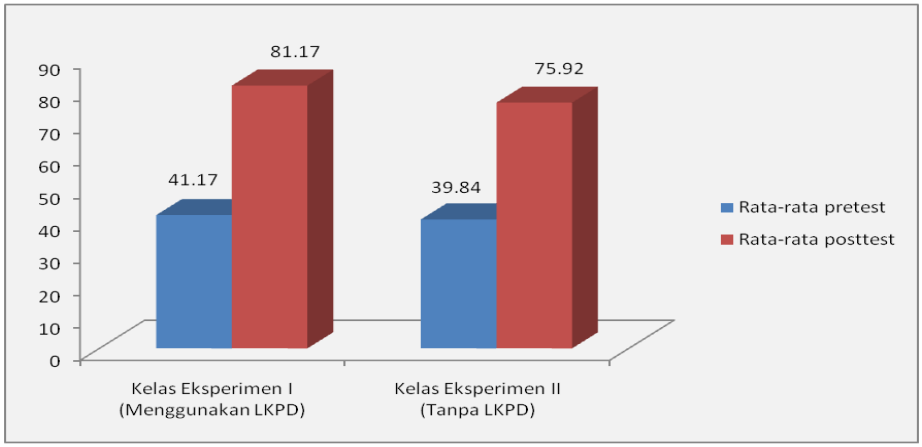

Figure 1: Diagram of the average pretest and posttest scores in the Experiment and Control class

Results of Data Analysis

Homogeneity Test

Through the Levene Statistical test results will be obtained, to see the homogeneity of the data variants in the study. The following is a table of homogeneity test results :

Table 2. Test of Homogeneity of variances

	Levene Statistics	df1	df2	Sig.
Pretest	.909	1	47	.345
Posttest	.481	1	47	.492

Source: Output data is processed by SPSS

Based on the results of the tests that have been carried out through the application of the Levene Statistical test from the SPSS program, the results of the significance level at the pretest are 0.345 and the results of the significance level are 0.492, which means that P> 0.05, this shows that the results of the homogeneity test have a homogeneous variant.

Normality test

Through the application of the Shapiro-Wilk test the help of the SPSS program is useful for testing data normality with a significant level of 5% or 0.05. The following is a table of normality test results.

Table 3. Test of Normality

Class		Shapiro-Wilk		
		Statistics	Df	Sig.
Pretest	Experiment	.928	24	.126
	Control	.954	25	.384
Posttest	Experiment	.935	24	.170
	Control	.945	25	.256

Source: Output data is processed by SPSS

Based on the results of the normality test that has been carried out, the results of the significance of the pretest in the Experiment class are 0.126 along with the posttest which shows the number 0.170. The posttest in the Control class shows the number 0.384 and the posttest is 0.256. Based on these results it can be concluded that the pretest and posttest of the two classes show results that P > 0.05, this indicates that all of the data is normally distributed.

Hypothesis testing

Test this hypothesis using the application of the SPSS program, namely through the Independent Sample T-Test statistical test . The results of the hypothesis test show that there are differences in the learning outcomes of students using LKPD and without LKPD. The following are the results of the t test:

Table 4 Hypothesis Testing

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	Q	Df	Sig. (2-tailed)	Mean Differences	std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Results	Equal variances assumed	.481	.492	2,894	47	**040**	5,247	1813	1,600	8,893
	Equal variances not assumed			2,889	46,243	040	5,247	1,816	1,592	8,902

Source : Output data is processed by SPSS

Through the t-test, the results are obtained, namely the significance level is 0.040. Because the sig value is 0.040 <0.050, Ha is accepted and Ho is rejected. So it can be concluded that at the 95% confidence level there are differences in student learning outcomes using the Problem Based Learning model with and without using worksheets on biodiversity material in class X.

Discussion

Based on the research results that have been described, the results show that there are differences in the learning outcomes that students get between the experimental class and the control class. The difference in learning outcomes seemed to increase after implementing the Problem based learning model accompanied by student worksheets in X-1 as the experimental class the increase was indicated by an average value of 81.17 while in X-2 as the control class had an average the value is 75.92 . The results of the Independent Sample T-test show a significance level of 0.40 <0.050, so Ha is accepted and Ho is rejected, which means that there are differences in the learning outcomes of students using the Problem Based Learning model with and without using LKPD on biodiversity material in class X SMA SPAB 8 Saentis. It can be seen from these results that the experimental class through Problem Based Learning learning using LKPD has obtained better results than the control class which only studied Problem Based Learning. This finding is in line with Chasana (2018) who found that the experimental class sample received treatment in the form of applying the Problem Based Learning model assisted by LKPD on banking material has increased learning outcomes that are higher than the control class. Furthermore, Swiyadnya (2021) also provides similar results where the Problem Based Learning model assisted by LKPD is effective in improving student learning outcomes. This can be caused by several influencing factors.

The application of the Problem Based Learning learning model with the help of LKPD can make students more independent and active in the process of learning. During group discussions the students were enthusiastic in working on the LKPD that had been provided, they worked together in solving any problems found in the LKPD and exchanging information, this could minimize the teacher's role in learning so that teaching and learning activities were more active and not dependent on the teacher . Students can also more easily understand the material because in the LKPD there is a summary of the material, the stages of problem solving and practice questions. So that students can gain broader knowledge, stimulate thinking skills and improve learning outcomes. So, the teacher is only a facilitator during the learning process. This is in line with Arsyad's opinion in Rohaeti et al. (2009), who said LKPD can help learning activities to be more focused, the message to be conveyed is clearer, and can motivate students by directing students' attention so that they can learn on their own according to their abilities and make students learn independently.

When the learning took place, students in the control class responded well to what the researcher conveyed regarding the relationship between the material and everyday life, students were also quite enthusiastic when the researcher conveyed the problems to be discussed. However, in study groups, students are less active in discussing problem solving so researchers have to ask questions to stimulate their activity, students tend to be passive during learning and most students do not bring biology books to school. The willingness to learn of students is still lacking when viewed from their activities the problem-based learning model to improve learning outcomes in this study is in accordance with the concept of constructivism learning, where learning activities require students to play an active role in building their own knowledge through solving real problems in life. Learning activities like this can improve students' understanding and skills through completing concepts and ideas with the mindset that students already have (Rusman, 2010). Therefore, the results of this research descriptively show that the learning outcomes of students in the Experiment class, namely the class taught with the Problem Based Learning model using LKPD, have a higher increase in learning outcomes than the Control class, namely the class taught with the Problem Based Learning model without LKPD.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that there are differences in student learning outcomes by applying the Problem Based Learning learning model using LKPD and without LKPD on biodiversity material in class X SMA PAB 8 Saentis TP 2022/2023, with an average difference 4.47 with a significance level of $\propto = 0.05$.

REFERENCE

Abas, (2012). Comparison of Learning Outcomes of the Cooperative Learning Model with the Science Technology Society Model in Class X MAN 1 Students of the Bengkulu City Model. *Journal of Exacta, 10*(1):11

Atikasari, et al. (2012). Effect of Problem Based Learning Approach in Environmental Pollution Material on Analytical Ability. *Unnes Journal Of Biology Education, 1*(3):219-227.

Chasanah, Uswatun .(2018). Comparison of Learning Outcomes Through the Application of the Problem Based Learning (PBL) Learning Model With and Without Using Student Worksheets (LKPD) on the Principal Material of Banking Credit Class X Banking at SMKN 10 Surabaya. *Journal of accounting education. 6*(3).

Herti AP, R .(2017). Comparison of Student Learning Outcomes in the Use of Problem Based Learning (PBL) Learning Models With and Without Using Student Activity Sheets (LKS) on Accounting Class XI Bank Reconciliation material at SMK Negeri 4 Surabaya. *Journal of Accounting Education, 5*(3) : 1-7.

Ilmi, N Dan Restuati, M. (2015). Comparison of Student Learning Outcomes Using Problem Based Learning and Learning Cycle Learning Models on the Subject Material of the Human Reproductive System in Class XI SMA Dharmawangsa TP 2014/2015. *Pelita Education Journal, 4*(3):180-190

Koeswanti, HD (2018). *Cooperative Learning Model Experiments in Learning Writing Skills of Student Scientific Papers in View of the Ability to Think Logically*. Satya Wacana Pres.

Nasution, MK, (2017), Use of Learning Methods in Improving Student Learning Outcomes, *Scientific Journal of Education, 11*(1): 9-16

Rohaeti, E., Widjajanti, E., and Padminingrum, RT, (2009). Development of Student Worksheets (LKS) for Chemistry Subjects for Middle School, *Journal of Educational Innovation, 10*:1-11

Rusman. (2010). *Learning models: Developing Teacher Professionalism*. Jakarta : PT Raja Grafindo Persada.

Swiyadnya, IMG, Wibawa, IMC & Sudiandika, IKA (2021). LKPD Assisted Problem-Based Learning Effectiveness Model for Learning Outcomes Science Content, *MIMBAR PGSD Undiksha, 9*(2), 203-210.

Ulfatuzzahra, T. (2020). Development of learning media based on Lectora Inspire on social science subjects. *Journal of IPS Education, 7*(1):46

Utomo, T, Wahyuni, D, Hariiyadi, S., (2014). The Influence of the Problem Based Learning Learning Model on Concept Understanding and Creative Thinking Ability of Grade VIII Students Odd Semester SMPN 1 Sumbermalang Situbondo Regency Academic Year 2021/2013, *UNEJ Educational Journal, 1*(1):5-9

Widayanti, R, Nur'aini, DK (2020). Application of Problem Based Learning Learning Models to Improve Mathematics Learning Achievement and Student Activities. *Mathema Journal, 2*(1):12-23.