

The Effect of Problem Based Learning on Understanding of Prospective Elementary School Teacher

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ABSTRAK

Sebagian besar pemahaman calon guru SD masih rendah. Hal ini dibuktikan dengan nilai tugas calon guru yang belum mencapai standar prestasi yang ditetapkan universitas. Model PBL merupakan cara yang efektif untuk menghasilkan keterampilan penting seperti keterampilan komunikasi, manajemen proyek, kolaboratif, dan inovatif. Tujuan penelitian ini adalah untuk menganalisis pengaruh metode problem based learning terhadap tingkat pemahaman calon guru sekolah dasar di Indonesia. Penelitian ini menggunakan metode kuantitatif dengan desain eksperimen semu. Desain eksperimen yang digunakan adalah pretest and posttest control group design. Teknik pengumpulan data menggunakan metode tes. Populasi dan sampel dalam penelitian ini terdiri dari 2 kelas jurusan pendidikan sekolah dasar. Instrumen yang digunakan dalam penelitian ini adalah tes, yaitu soal pilihan ganda pretest dan posttest. Teknik yang digunakan untuk menganalisis data untuk menguji hipotesis penelitian adalah One Way Anova. Berdasarkan hasil penelitian menunjukkan bahwa rata-rata nilai posttest kelas eksperimen dengan penelitian pembelajaran berbasis masalah adalah 84,82 sedangkan rata-rata pada kelas kontrol adalah 82,32. Terjadi peningkatan sebesar 2,5 dengan menggunakan metode problem based learning pada perkuliahan bahasa Indonesia. Kesimpulannya adalah terdapat pengaruh yang dapat meningkatkan pemahaman calon guru SD selama proses perkuliahan bahasa Indonesia menggunakan metode problem based learning.

ABSTRACT

Most of the understanding of prospective elementary school teachers is still low. This is evidenced by the assignment score of prospective teacher that have not reached the achievement standards set by the university. The PBL model is an effective way to produce important skills such as communication skills, project management, collaborative, and innovative. The purpose of the study was to analyses the effect of the problem based learning method on the level of understanding of prospective elementary school teachers in Indonesia. This study uses quantitative methods with a quasi-experimental design. The experimental design used is the pretest and posttest control group design. Data collection techniques are using the test method. The population and sample in this study consisted of 2 classes majoring in elementary school education. The instrument used in this study was a test, namely pretest and posttest multiple choice questions. The technique used to analyze the data to test the research hypothesis is One Way Anova. Based on the results of this study, it showed that the average posttest value of the experimental class using problem based learning research was 84.82 while the average in the control class was 82.32. There is an increase of 2.5 by using the problem based learning method in Indonesian language lectures. The conclusion is that there is an influence that can increase the understanding of prospective elementary school teachers during the Indonesian language lecture process using the problem based learning method.

1. INTRODUCTION

COVID-19 was first discovered in late 2019 in fast-spreading China, and has since spread worldwide in a short time (Baber, 2020; Bentlage et al., 2020). This pandemic created major changes in

government, the global economy, the health care system, and the world of education which became the benchmark for the nation's progress (Atmojo et al., 2020; Izhar et al., 2022). The increasingly widespread spread of this dangerous virus throughout the world is forcing educational institutions to change their online learning system to control the spread of this virus (Sathishkumar et al., 2020). Online learning can be effective in digitally developed countries, but for developing countries, careful preparation is needed (Adnan, 2020; Susanti & Tarmuji, 2016). The development of technology greatly influences every human life which makes technology a position that affects the world of education. The use of digital technology in the context of education is now different and has brought several new terms into the literature such as online learning, web-based learning, blended learning, e-learning, learning management system (LMS), computer-assisted learning instruction (CAI), massive open online courses (MOOCs), virtual learning environments (VLE), etc (Kanojiya, 2020; Korkmaz & Toraman, 2020). Students can take online classes anywhere and anytime as long as they have access to the Internet and appropriate electronic devices. Lecturers are tools to change the way of thinking and acting towards a goal that has meaningful value in life both individually, in society, and in the state (Bahasoan et al., 2020; Mather & Sarkans, 2018).

The Problem Based Learning (PBL) method has been known since a long time ago. PBL is a student-centered approach that is widely used as a teaching method such as in schools and higher education institutions (Chan & Blikstein, 2018; Hasibuan et al., 2019). This learning uses a constructivist approach so that students try to solve everyday problems in a collaborative environment. The PBL model is an effective way to produce important skills such as communication skills, teamwork, inquirybased learning, peer learning, project management, collaborative and individual innovation and creativity (Mustofa & Hidayah, 2020; Serevina et al., 2018). The application of the problem-based learning model used in research, both in the first phase (learning in the classroom) and in the second phase (learning outside the classroom) refers to the syntax of the problem-based learning model. Implementation of problem based learning method has revealed many advantages, but new exploration of very complex environments may result in heavier memory workloads (Duda et al., 2019; Ramadhani et al., 2019).

Lecturers and their professional teaching methods are one of the main factors that determine the quality of education. Understanding the concept is the main requirement for further learning activities, so without adequate understanding it will be difficult to continue the Indonesian language lecture material for SD I further for students (Baiduri et al., 2020; Inaltekin & Akcay, 2021). So that students can understand the meaning of Indonesian language lectures, lecturers are required to foster students' interest in learning so that they can be interested in Indonesian elementary school I lectures (Hasibuan et al., 2019; Setiawan et al., 2020). In order to measure students' thinking power, especially the level of understanding in solving problems and understanding students' concepts, several alternative methods and or learning strategies are considered potential, so lecturers need to try to use them, including Indonesian language teachers (Aritia & Suyanto, 2019; Habók & Magyar, 2018).

Based on the results of observations and interviews with lecturers who teach Indonesian Language courses for SD 1, it is known that most of the understanding of prospective elementary school teachers in the second semester of the elementary school teacher education study program at PGRI Yogyakarta University is still low. This is evidenced by the results of assignments, mid-semester exams and end semester exams that have not reached the achievement standards set by the university. The causes of the low level of student understanding include: (1) students do not listen well to the explanation of the material from the lecturer, (2) use the lecture method so that students feel bored quickly, (3) lack of motivation in each student, (4) student enthusiasm in learning. Understanding and paying attention to the learning process is still lacking, (5) there is no evaluation at the end of the lecture, so an interesting and effective evaluation tool is needed in the learning process.

To overcome this, lecturers in learning activities are carried out actively and interactively and are more practical than listening to passive lectures in class (Malalina & Kesumawati, 2014; Zamzami & K, 2018). Furthermore, the learning process can take place as desired, one of which can use learning methods when learning such as the Problem Based Learning method. This Problem Based Learning method can be integrated with character values to prepare life and career skills such as being religious, curious, communicative, creative, disciplined, caring for the environment and being responsible (Gorghiu et al., 2015; Nurtanto et al., 2019). Problem Based Learning method can also find out students ability or level of understanding of Indonesian language lectures for SD 1 and can use pre-test and posttest questions.

Many previous studies related to student understanding have been carried out. Among them is research with the title "The Effect of Online Lecture Methods on the Level of Understanding of Investment Law Lecture Materials for Indonesian University of Technology Students" saying that online lectures are currently one of the effective lecture methods during the COVID-19 pandemic (Desak Made Rai Ningsih, 2020). The study concluded that there is an effect of the online lecture method on the level of students' understanding of investment law courses at the Indonesian University of Technology. In line with research

conducted with the title Student Understanding Levels between Online and Offline Learning in the Covid-19 Pandemic Period Using the Forward Chaining Method (Sitanggang, 2022). One of the data technologies that functioned in the world of learning during the COVID-19 pandemic was online education. Online education is used as a liaison between lecturers and students in an internet network that is accessed anytime. However, student learning outcomes in online and offline learning have not shown maximum results cause of various obstacles. Based on the problem and previous study, the researcher is interesting to conducting study related to PBL and teacher understanding. The purpose of this study was to examine the effect of the Problem Based Learning Method on the level of understanding of prospective elementary school teachers in Indonesia.

2. METHOD

The research used in this study is this study using quantitative methods with a quasi-experimental design. The experimental design used is the Pretest-posttest Control Group Design (Kholifah et al., 2020; Madadzadeh, 2022). The population used in this study was students of PGRI Yogyakarta University who had 8 classes. The research subjects were second semester students of PGSD University of PGRI Yogyakarta. The class used in this study consisted of 2 classes, namely class A7-21 and class A8-21 which were taken by simple random sampling and purposive sampling. The experimental class is class A8-21 and the control class is class A7-21. Problem based learning method in the experimental class, the class is given treatment to measure the level of understanding of prospective elementary school teachers and without treatment by measuring the results of understanding of prospective elementary school teachers.

Data collection techniques are using the test method. The instrument used in this study was a test, namely pretest and posttest in the form of multiple choice questions. The pretest questions were given before the treatment was given to the experimental class and the control class. After being given treatment using posttest questions, it can measure the level of student understanding of the material that has been explained. Previously, the test instrument had passed validity and reliability testing by 3 validation experts from PGRI Yogyakarta University. The technique used to analyze the data to test the research hypothesis is One Way Anova. Before testing the hypothesis, there are several requirements that must be met and need to be proven. The requirements in question are as follows: 1) the data analyzed must be normally distributed and, 2) to find out the data being analyzed is homogeneous. Both of these prerequisites must be proven first, so to fulfill this, a prerequisite analysis test is carried out by conducting a normality test and a homogeneity test. Normality test is using SPSS version 24 for windows Shapiro Wilk statistical test at a significance of 0.05. Meanwhile, the homogeneity of variance test in this study was carried out using Levene's Test of Equality of Error Variance with the help of SPSS through the Box's M test. After the prerequisite test was carried out, it was continued by calculating the t-test, namely the paired sample t-test.

3. RESULT AND DISCUSSION

Result

The following is data from research on the effect of problem based learning on the understanding of prospective elementary school teacher students in Indonesia as show in Table 1.

Table 1. Recapitulation of the Calculation of Understanding Scores of Prospective Elementary School Teachers

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Experiment	28	50	100	74.46	12.790
Posttest Experiment	28	60	100	84.82	9.278
Pretest Control	28	45	95	73.21	13.348
Posttest Control	28	50	90	82.32	11.901
Valid N (list wise)	28				

Based on the Table 1, it can be seen that N or the total population of the two classes are 28 students, the minimum pretest score for the control class (without using the problem based learning method) is 45 points, while the minimum score for the experimental pretest (using the problem based learning method) is 50 points. It can be seen that the minimum posttest score for the control class (without using the problem based learning method) is 50 points, while the minimum posttest score for the experimental class (using the problem based learning method) is 60 points. The maximum pretest score for the control class (without using the problem based learning method) is 95 points, while the maximum pretest score for the experimental class (using the problem based learning method) is 100 points. In addition, the maximum

posttest score for the control class (without using the problem based learning method) is 90 points, while the maximum posttest score for the experimental class (using the problem based learning method) is 100 points. So it can be concluded that there is a difference between the point value between the minimum value and the maximum value. From the data, it can be seen that the average posttest value of the experimental class using the problem based learning method is 84.82 while the average in the control class is 82.32. There is an increase of 2.5 by using the problem based learning method in Indonesian language lectures. Research on other materials also has a significant impact. The use of problem based learning methods in Indonesian language lectures has a significant effect on the understanding of prospective elementary school teachers. The average pretest value of the experimental class using the problem based learning method was 74.46 while the average value of the pretest in the control class was 73.21 so there was an increase in the average score of 1.25 using the problem based learning method.

Based on the analysis of the data above, it can be seen that the experimental class has an influence on the understanding of prospective elementary school teachers compared to the control class. So the assumption test is carried out before testing the hypothesis, namely the analysis prerequisite test, namely the normality test of the data and the homogeneity of variance test. This test aims to determine the distribution of data from the two classes normally distributed. Normality test was carried out using the Kolmogorov Smirnov test, by looking at the Kolmogorov and Asymp values. his sig. With normality acceptance criteria is if the significance value of the calculation results is greater than $\alpha = 0.05$ then the distribution is normal, otherwise if it is smaller than $\alpha = 0.05$ then the distribution is declared abnormal. The results of the normality test of the experimental group can be seen in [Table 2](#).

Table 2. Normality Test Results

Statistic		Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Teacher Candidate Understanding Primary School	Pretest Eksperiment (Understanding)	0.124	28	0.200	0.966	28	0.489
	Postttest Eksperiment (Understanding)	0.123	28	0.200	0.953	28	0.236
	Pretest Control (Class)	0.125	28	0.200	0.963	28	0.412
	Postttest Control (Class)	0.137	28	0.192	0.942	28	0.125

The normality test is a method used to find results from the understanding of prospective elementary school teachers in Indonesian language lectures using the problem based learning method whether the data is normally distributed or vice versa. So it can be seen from [Table 2](#) that the results of the normality test can be analyzed by comparing the largest (sig.) value with a significant level ($\alpha = 0.05$). If the value (sig.) $> (\alpha = 0.05)$ is data that is normally distributed and vice versa if the value (sig.) $(\alpha = 0.05)$ is data that is not normally distributed. Based on [Table 2](#), it can be found the value (sig.) of the experimental class and the value (sig.) of the control class which has a value higher than 0.05. The results of the two classes show that the data is normally distributed. Then proceed with homogeneity test. The calculation in the homogeneity test is significant level $\alpha = 0.05$. Homogeneity test if the value (sig.) is higher than the significant level ($\alpha = 0.05$), then the data is homogeneous. On the other hand, if the result is (sig.) < 0.05 , then the data is not homogeneous. In [Table 2](#) shows the calculation results in both classes have a value (sig.) $0.392 > 0.05$, so it is a homogeneous data. Then homogeneity of variance test result is show in [Table 3](#).

Table 3. Results of Homogeneity of Variance Test

	Statistic	Levene Statistic	df1	df2	Sig.
Teacher Candidate Understanding Primary School	Based on Mean	1.705	3	108	0.170
	Based on Median	1.405	3	108	0.245
	Based on Median and with adjusted df	1.405	3	102.804	0.246
	Based on trimmed mean	1.670	3	108	0.178

Based on [Table 3](#), it is known that the significance value (sig) on the Based on Mean is 0.170, where the value is $0.170 > 0.05$, so it can be concluded that the data is homogeneous. The next step, the researcher tested the hypothesis, namely the t-test which was calculated with SPSS version 24 for windows as show in [Table 4](#).

Table 4. Results of T-Test

Statistic	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Pretest Eksperiment - Posttest Eksperiment	-10.357	13.048	2.466	-15.416	-5.298	-4.200	27	0.000
Pair 2 Pretest Control - Posttest Control	-9.107	13.747	2.598	-14.438	-3.776	-3.505	27	0.000

Based on Table 4, show the results of the calculation of the paired sample t-test with SPSS version 24 for windows, there are requirements when making decisions, namely if the value of sig. (2-tailed) is smaller than the value of α (0.05) then H_0 and H_1 are accepted. Performing the paired sample t-test type test serves to test the hypothesis of an increase in the pretest and posttest scores for the class that was given treatment using the problem based learning method and non-treatment class. The results show that in table 4 it has a smaller significance value of 0.05, which is $0.000 < 0.05$. So it can be concluded that there is an effect of using the problem based learning method on the understanding of prospective elementary school teachers in Indonesia in Indonesian language lectures.

Looking at the data, theoretically it can be said that the use of problem based learning methods better and more effective way to help the understanding of prospective primary school teachers in Indonesia. Therefore, based on the analysis of the hypothesis, there are significant differences in the understanding of prospective elementary school teachers in Indonesia together between class students experiment (A8-21) during the learning process using the problem based learning method and control class students (A7-21) during the lecture process using measuring the results of understanding of prospective elementary school teachers in Indonesia. So that it can be proven that there is an effect of using the problem based learning method on the understanding of prospective elementary school teachers in Indonesia in Indonesian language lectures. Then for Anova test result is show in Table 5.

Table 5. Results of One Way Anova

Statistic	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2761.384	3	920.461	6.465	0.000
Within Groups	15375.893	108	142.369		
Total	18137.277	111			

Base on Table 5, research data that has been collected and then analyzed statistically using the Univariate Analysis of Variance (ANOVA) technique. Before analyzing the data to test the research hypothesis, assumptions were tested in the form of testing the normality and homogeneity of the research data. All statistical analysis using SPSS version 24 for Windows. Based on the results of the explanation above, theoretically it can be said that the use of problem based learning methods is better and more effective. This can also be proven by the ANOVA results in the table below, namely the data results show a significance value of $0.000 < 0.05$ or less than 0.05.

Discussion

One alternative way is done during the lecture process that can develop thinking skills and the formation of attitudes for elementary school teacher candidates using the Problem Based Learning method (Nugraha, 2018; Thompson, 2011). Critical thinking has always been the goal of the learning and assessment process. When the lecturer explains the lecture material, students are expected to pay close attention, focus, and concentrate so that the material that has been delivered can be understood. During lectures using the problem based learning method, students or prospective elementary school teachers are led through a process that involves goals, problems, research experiences, solution development activities and assessments (Ertmer & Simons, 2006; Pecore, 2012). The successful application of the problem based learning method requires lecturers to take on the role of guiding and paying attention to various aspects of the learning environment that occur.

In implementing the problem-based learning method, the approach is similar to the discussion method, namely student centered learning. The use of problem based learning methods in Indonesian

language lecture materials can improve students' creativity and problem-solving abilities which are part of creative problem solving abilities (Sipayung et al., 2021; Surur & Tartilla, 2019). The lack of creative thinking and problem solving skills can be overcome by training students to improve their creative thinking and problem solving skills in every problem case (Leasa et al., 2021; Yew & Goh, 2016). When analyzing the problem it has an impact that is used during the learning process.

Thus, there is an influence that can improve the understanding of prospective elementary school teachers in Indonesia during the Indonesian language lecture process using the problem based learning method. This can be found because the use of the problem based learning method pays attention to several factors that can help students understand lecture material, especially Indonesian language material. So that students become more focused, concentrated, and understand in Indonesian language lectures. Previous study state the use of problem based learning methods is very well applied in lectures because students can apply the information they get in everyday life in line with and encourage students to think critically (Sulaiman & Azizah, 2020). In addition, in another study which states that learning presents various authentic and meaningful problem situations to students so that they investigate them (Oktavianingrum et al., 2020). This is reinforced by (Oktaviyanti & Novitasari, 2019) which states that learning that involves the real world will make the learning process more meaningful. So that students can be actively involved in lectures and understand the explanation of the material presented.

The implication of this study will provide an insight about how problem based learning affects the understanding of prospective elementary school teachers. This will be very useful especially for teachers as a reference to find out the effects and benefits of problem-based learning. This research still has limitations, one of which is the scope of the study is very limited which only involved one school institution, it is PGRI Yogyakarta University. It is hoped that the next research will be able to further expand the scope of research and deepen the aspects that have not been discussed in this study related to the effect of problem based learning on teacher understanding.

4. CONCLUSION

Based on the results of the research that has been done, it is hoped that lecturers and students will use the problem based learning method as an interesting and interactive support method at the school and college level. So things that need to be considered in using problem based learning methods are (1) the motivation of lecturers and students in using problem based learning methods, (2) involving students in the learning process when using problem based learning methods so that student learning outcomes will increase. In the process of delivering material delivered by lecturers to students, it is important to note, because students are expected to be able to understand the material presented by lecturers during the lecture process, especially in Indonesian so that there is an increase in student understanding and better learning outcomes.

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