EDUCATIONAL INSIGHTS
Vol. 1, No. 1, Juni 2023, pp. 21-29
e-ISSN: xxxx-xxxx, URL: https://eduinsights.id

Appliying The Influence of Problem Based Learning (PBL) Applications Using Lectora Inspire Media on Student Problem Solving Ability

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Article Information

Article History:

Received May 22, 2023
Revised June 27, 2023
Published June 30, 2023

DOI:
10.58557/eduinsights.vxix

Keyword:

Problem Based Learning Model
Learning Media
Problem Solving

ABSTRACT

One of the mathematics learning successes is that students are able to complete mathematical problem solving. Existing conditions that students are still unable to complete mathematical problem solving. Learning models combined with learning media are expected to enable students to solve mathematical problems. The purpose of this study was to determine the effect of the application of Problem Based Learning (PBL) on the material of ruang sisi datar (kubus) with the help of Lectora Inspire media on students' geometry problem solving abilities. Lectora inspire is an e-learning content development tool that is easy to use as an online learning. This research was carried out in SMPN 1 Cilimus, Kabupaten Kuningan. The research method used is quantitative method while the research design used is Posttest-only Control group design. The study population was all student class VIII and the sample used was class VIII4 as an experimental class and class VIII2 as a control class. Based on the acquisition of research data obtained the average mathematics posttest of the experimental class students was 72.75 and the posttest control class was 47.47. Student responses to the application of problem based learning learning models with an average score of 78.13, the average student response to the Lectora Inspire media was 78.7. Based on the data analysis test, it is known that $t_{count} < t_{table}$ or $1.570 < 2.024$ so it can be concluded that there is no influence of the use of Lectora Inspire media on students' geometry problem solving ability on the subject of the cube.

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1. INTRODUCTION

Students' mastery of mathematics subject matter is still relatively low, presumably because students are not interested in mathematics, one of which is the material for flat sided spaces (cubes). Geometry subject matter (flat and space) is a part of mathematics that discusses the shape and size of an object that has a certain regularity. Students who are not interested in mathematics, students do not understand the concept of geometry, students who do not understand the concept of geometry tend to have difficulty solving problems related to geometry (Rohimah & Nursuprianah, 2016, p. 14).

Given the important role of the teacher in the learning process, new efforts are needed in learning mathematics. The teacher's obligation in the learning process is not only to transfer knowledge but also to provide positive encouragement so that students are motivated, provide a pleasant learning atmosphere, so that they can develop as much as possible (Daryanto & Karim, 2017, p. 26). One thing that must be done is to choose and determine the right learning media in accordance with the subject matter to be delivered and as attractive as possible and keep abreast of the progress of information technology development.

Based on the information obtained from the mathematics teacher at SMPN 1 Cilimus, he said that the students' geometry problem solving abilities varied, most students still had difficulty solving problems that required students to be able to solve certain geometry problems in an orderly and systematic manner. Students often succeed in solving certain problems but fail if the context of the problem is slightly changed. Especially questions in the form of stories or descriptions, there are still many who experience difficulties in solving problems.

In solving a problem every individual certainly has different abilities. According to Yunus (2016, p. 24) capability is the capacity of a set of resources to integratively carry out a task or activity. To find out how far a student or someone is able to complete a task or activity, appropriate media and methods are needed in a learning process.

Effective learning is learning to use tools (learning media), with learning media students will more easily understand math lessons (Maulana, Saluky, & Misri, 2017, p. 7). One of the media that is currently widely used by teachers is Microsoft PowerPoint. However, in practice it was felt to be less than optimal, during the learning process the teacher only instructed students to record the material on the power point slides, so that in this case students were not given problem solving exercises and in the end students did not know how to solve math problems. According to Anggraeni (2010, p. 33) one of the factors causing the low problem-solving ability of students is the teaching method applied by the teacher. Therefore, teachers should be able to apply learning models that are adapted to mathematics material to hone students' mathematical abilities.

The problem-based learning approach in 21st century education is related to the use of intelligence from within individuals who are in a group of people, or the environment to solve meaningful, relevant and contextual problems (Rusman, 2016, p. 230). The problem-based learning model according to Paloloang (2014, p. 68) is a learning model that focuses on the process of investigating and solving problems, especially regarding everyday life. Problem-based learning is a learning model, in which students are initially faced with a problem, then followed by a student-centered information-seeking process (Suprihatiningrum, 2013, p. 215). Teachers who apply the problem-based learning learning model act as facilitators and guides for students so that they can practice solving problems as well as pay attention to and provide directions related to problem solving steps.

Problem solving abilities for students must be pursued so that students can find various solutions to completion. According to Zevenbergen (Ulya, 2015, p. 2) that it is very important for students to have a strong understanding and knowledge to be able to solve problems, and have solutions through various strategies used when dealing with different problem solving. Of course, in this case the teacher and students continue to work together in increasing complex understanding and knowledge in order to solve problems.

Problem solving according to Muchlis (2002, p. 137) is the projection of learning to create new ideas and use rules that have been learned to create a new concept. Therefore we need a model or learning that trains student problem solving. One of the innovations in learning is the use of technology and information-based learning media.

According to Munadi (2008, p. 7) learning media is anything that can convey and channel messages from sources in a planned manner so as to create a conducive learning environment, so that recipients can carry out the learning process efficiently and effectively.

The media that can be used to solve mathematical problems in the field of information and technology-based geometry is to use the Lectora Inspire software to facilitate the learning process. Lectora inspire is an Authoring Tool developed by Trivantis Corporation. One of the facilities that may be used to design learning media for beginners is to use the Title Wizard or Blank Title.

Lectora inspire was developed by Trivantis Corporation which is an Authoring Tool for e-learning content development. Its founder was Timothy D. Loudermilk in Cincinnati, Ohio, USA in 1999 (Masud, 2012, p. 1). In 2000, Lectora Inspire became the first AICC-certified authoring system.

2. METHOD

This research was conducted at Cilimus 1 Public Middle School, which is located at Jalan SMP No. 19 Bojong, Cilimus District, Kuningan Regency. This research method uses a quantitative approach. Experimental design is a design that contains steps and actions to be carried out in experimental research activities, so that the necessary information about the problem under study can be factually collected (Arifin, 2011, p. 76). The research design used was the Posttest-Only Control Group. The design in this design involved two groups, namely the experimental group and the control group. In this research design, the two research sample groups will be given a test after the treatment in the form of the application of Problem Based Learning (PBL) assisted by media lectora has been completed in the experimental class. According to Indrawan and Poppy (2016, p. 58) the "Posttest-Only Control Group Design" design scheme is as follows:

EG	R1	X	O1
CG	R2		O2

EG : Experiment Group
CG : Control Group
X : Lectora inspire media treatment using the Problem Based Learning learning model
O1 : Posttest experimental and control classes (before being given treatment)
O2 : Posttest experimental and control class (after being given treatment)

Based on the simple random sampling technique, the research samples were obtained, namely class VIII4 as the experimental class and class VIII2 as the control class in this study.

3. RESULT AND DISCUSSION

In this study, the researcher took a sample of class VIII4 students of SMP Negeri 1 Cilimus, Kuningan Regency, totaling 37 people, so that the distribution of questionnaires and math tests obtained data from the experimental post-test results which can be seen in Table 1.

Table 1 Deskripsi Postes Eksperimen

Statistik	Postes experiment	Postes control
N	37	37
Range	60,00	60,00
Minimum	40,00	20,00
Maximum	100,00	80,00
Mean	72,7568	47,4706
Std. Deviation	17,75357	16,23546
Variance	315,189	263,590

Based on Table 1, the description of the experimental post-test results shows that the average value is 72.75, the minimum value is 40, the maximum value is 100, the standard deviation is 17.75 and the variance is 315.18. The results of the calculation of the posttest description analysis for the control class of 37 students show an average score of 47.47, a minimum score of 20, a maximum score of 80, a standard deviation of 16.23 and a variance of 263.56.

Description of the response of the Problem Based Learning (PBL) model, to measure the response to the application of the problem based learning model with the lectora inspire media, has been carried out by giving a questionnaire totaling 20 statements using a Likert scale. The questionnaire was distributed to 37 students in class VIII. This questionnaire is based on ten indicators that have been compiled and validated. The results of distributing the lectora inspire learning media questionnaire in the experimental class can be seen in Table 2.

Table 2. Description of the Response Model Problem Based Learning (PBL)

Statistik	Score
N	37
Range	49,00
Minimum	51,00
Maximum	100,00
Mean	78,1351
Std. Deviation	10,00323
Variance	100,065

Based on Table 2, it states the description of student responses to the response to the problem based learning model assisted by lectora inspire media, the results obtained from 37 students that the average score is 78.13, the minimum score is 51, the maximum score is 100, the standard deviation is 10 and the variance is 100,065. Meanwhile, the results of distributing the response questionnaire to the problem-based learning (PBL) model for each indicator are described in Table 3.

Based on Table 3 regarding the recapitulation of the percentage of indicators and aspects of the questionnaire applying the Problem Based Learning (PBL) learning model, it is known that the average percentage of preliminary indicators of learning objectives and motivating students to engage in problem solving activities is 84%, indicators formulate problem-centered geometry learning problems the real world is 81%, so it is known that the percentage of students' orientation aspects of the problem is 82.5%. The percentage of the aspect of organizing students to learn is 76% represented by the indicator of organizing students in learning geometry. The guiding aspect of individual/group experience is 79% represented by the indicator. Encouraging students to collect

appropriate information, carry out experiments to get explanations and problem solving. The percentage of aspects of Developing and presenting work/ reports is 72% represented by indicators of helping students plan and preparing appropriate works such as reports, and helping them to share assignments with friends, and the percentage of aspects of analyzing and evaluating the problem solving process is 78% represented by the indicators reflect or evaluate learning geometry, so that it can be seen that the highest percentage of aspects is the aspect of student orientation to the problem, which is equal to 82.5%.

Table 3 Recaptulation of Percentage of PBL Indicators and Aspects

Aspect	Indicator	Average	
		Indicator	Aspect
Student orientation on the problem	Introduction to learning objectives and motivating students to engage in problem solving activities	84%	82,5%
	Formulate geometry learning problems that are centered on real-world problems	81%	
Organizing students for guided learning/individual/group experience	Organizing students in learning geometry	76%	76%
	Encourage students to collect appropriate information, carry out experiments to get explanations and problem solving	79%	79%
Develop and present the results of the work / reports	Assist students in planning and preparing appropriate works such as reports, and help them to share assignments with their friends	72%	72%
Analyze and evaluate the problem solving process	Reflect or evaluate learning geometry	78%	78%

Descriptive of the response to the Lectora Inspire learning media, this questionnaire was made based on the ten indicators that had been compiled. The results of distributing the lectora inspire learning media questionnaire in the experimental class can be seen in Table 4. Based on Table 4, it states a description of student responses to the use of lectora inspire learning media. The results obtained from 37 students that the average score was 78.7, the minimum score was 58, the maximum score was 100, the standard deviation was 11.01 and the variance was 121.37.

Table 4. Description of Learning Media Responses Lectora inspire

Statistics	Score
N	37
Range	42,00
Minimum	58,00
Maximum	100,00
Mean	78,7297
Std. Deviation	11,01678
Variance	121,369

Meanwhile, based on Diagram 1, the results of distributing the response questionnaire to the application of learning media using lectora inspire for each indicator regarding the average percentage that the indicator participating in learning with the help of lectora inspire media has a percentage of 77%, indicators of motivation in learning using lectora inspire media have a percentage 82%, the indicator describes a flat sided space (cube) through video playback has a percentage of 84%, the indicator pays attention through the concepts conveyed by the teacher to memorize has a percentage of 79%, the indicator discussing geometry material with group friends has a percentage of 76%, the indicator conveys ideas in the presence of the teacher has a percentage of 75%, the indicator of listening to the teacher's explanation has a percentage of 81%, the indicator of learning material from other sources and assistive devices has a percentage of 77%, the indicator of developing students' ideas and creativity in learning has a percentage of 79%.

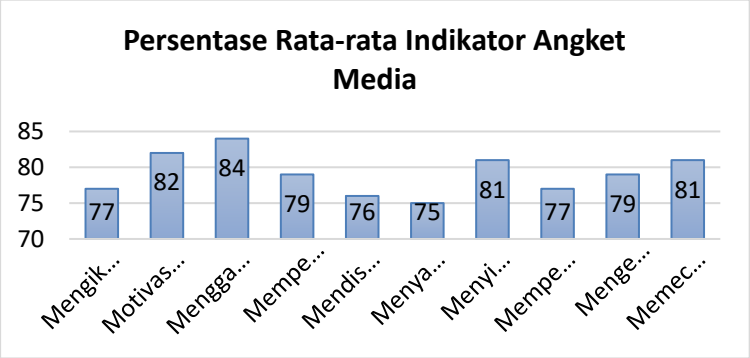

Diagram 1. Average Percentage of Indicators

The indicator for solving the problem of building a flat side (cube) has a percentage of 81%. In other words, indicators of motivation in learning using Lectora inspire media and indicators describing flat side shapes (cubes) through video playback have the largest percentage of student responses, namely 84%. Students' responses to the media used were on average in the satisfactory category.

Based on the results of the normality test with SPSS 20, the value of Sig.(α) Kolmogorov-Smirnov for research data on mathematics test results in the experimental class and control class, the response data for problem-based learning models and student responses to lectora inspire media are 0.711, 0.794 respectively , 0.960, 0.998 based on the acquisition of Sig. (α) for all research data results of more than 0.05 thus, the data comes from a normally distributed population. For the homogeneity test, it is known that the significance value is 0.234 > 0.05, because the significance value is greater than the specified α value, which is equal to 0.05, it can be concluded that the data is homogeneous.

Regression analysis was carried out to determine the influence between the dependent variable and the independent variable. The results of the regression test calculations can be seen in Table 5.

Table 5. Simple Regression Equation

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	40,222	20,925		1,922	,063
	Media Lectora	,413	,263	,256	1,570	,126

a. Dependent Variable: Postes Eksperimen

The regression equation that will look for the sig value of the constant is 0.063 while for the significance of the lectora learning media variable it is 0.126 which means more than 0.05. Thus the regression equation is:

$$\hat{Y} = 40{,}222 + 0{,}413X$$

$\hat{Y}$ = Students' geometry problem solving ability
X = Learning media *lectora inspire*
40,222 = the value of the price constant Y when X equals 0
0,413 = Directional number or linear regression coefficient

Because the value of b or the linear regression coefficient is positive, which is equal to 0.413, there is a positive relationship between the application of lecturea inspire learning media and students' geometry problem solving abilities. The results of the calculation of the coefficient of determination test can be seen in Table 6.

Table 6. Determination Coefficient Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,256[a]	,066	,039	17,40335

a. Predictors: (Constant), Angket Media Lectora

Based on the calculation results in table 4, it is known that the R Square is 0.066 and the correlation coefficient is 0.256, so the coefficient of determination can be calculated using the formula:

$$KD = r^2 \text{ x}100\%$$
$$= (0{,}256)^2 \text{ x } 100\%$$
$$= 6{,}55\%$$

Based on these calculations, it is known that the coefficient of determination is 6.55. This means that the effect of using lecturera inspire learning media is 6.55% and the students are determined by other factors. The results of the calculation of the hypothesis test with the help of SPSS show the output results as follows:

Table 7. Hypothesis Testing

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	40,222	20,925		1,922	,063
	Media Lectora	,413	,263	,256	1,570	,126

Based on the results of the calculation output using SPSS in the hypothesis test table above, it shows that the tcount is 1.570 with a significance of 0.126. For a sample of 37 students, it is known that df = 37-2 = 35 with an alpha level of 0.05, it is known that ttable is 2.024, so that tcount is smaller than ttable or 1.570 <2.024 so that H0 is accepted. In other words, there is no influence between lecturera inspire learning media and students' mathematical problem solving abilities.

In this study, the researchers tried to apply the Lectora Inspire learning media as an effort to provide an understanding of mathematics on the subject of geometry so that students could work on tests of geometry problem-solving abilities and obtain good grades or achievements.

Lectora inspire learning media is an audio-visual aid that can assist students in absorbing knowledge about mathematics to achieve certain competency standards. Lectora inspire learning media as an alternative to using mathematics learning media in class provides image and animation effects as well as opportunities for students to repeat learning or study independently after the class time is over. The Lectora Inspire learning media paired with the internet has an impact on students being able to learn additional without being limited by space and time. It is hoped that students can access Lectora Inspire-based learning more often via the internet.

The results of the calculation of the test description of students' geometry problem-solving abilities in the geometry subject experimental class show that the average value is 72.75 with a minimum value of 40 and a maximum of 100, so that it can be determined to have a range of 60. This indicates that there is a significant difference about 60 between the maximum and minimum values in the experimental class. The standard deviation number is 17.75 which indicates that the standard deviation of the average experimental class value is 17.75. While the variance or variety of students' math test scores is known to be 315.18.

In contrast to the condition of the control class which was not given special treatment such as the use of lecturea inspire learning media. It is known that the description of students' geometry problem-solving ability tests in the geometry subject experimental class is known that the average value is 47.47 with a minimum value of 20 and a maximum of 80, so that it can be determined to

have a range of 60. This shows that there is a significant difference about 60 between the maximum and minimum values in the experimental class. The standard deviation number is 16.23 which indicates that the standard deviation of the average experimental class value is 16.23. While the variance or variety of students' math test scores is known to be 263.56.

Judging based on the average results of differences in math test scores in the experimental and control classes that the experimental class average was 72.75 while the control class average was 47.47. It is clear that the average value of the experimental class math test is higher than the control class. On the other hand the maximum value for the experimental class is 100, while the maximum value for the control class is 80.

The results of processing and calculating the analysis of student responses to the Lectora Inspire learning media. It is known that the percentage of each indicator can be seen from diagram 1 that the motivational indicator in learning using Lectora inspire media and the indicator describing a flat sided space (cube) through video playback has the largest percentage of student responses, namely 84%. Meanwhile, when viewed from the overall questionnaire of student responses to the use of Lectora Inspire learning media, it can be seen that the indicator of paying attention to the concepts conveyed by the teacher to memorize has a percentage of 11% greater than the other indicators. This means that in general students pay attention to the concepts taught by the teacher and to memorize these concepts. Students are more accustomed to memorizing concepts conveyed by the teacher in class.

The results of the data analysis show that there is no influence between the use of lectora inspire media on students' geometry problem solving abilities. This can be seen from the results of calculations using the SPSS software that the results of the regression analysis have a coefficient of determination (R Square) of 0.065, which means around 6.5 % dependent variable students' geometry problem solving ability (Y) is explained by the independent variable the application of learning media lectora inspire (X) and the remaining 93.5% is influenced by other factors.

Based on the results of hypothesis analysis using the t test, it is known that there is a difference between the experimental and control classes on students' geometry problem solving abilities. It can be shown from the SPSS calculation results that tcount > ttable. Because tcount is greater than ttable or 6.245 > 2.024 so H0 rejected. In other words, there is a difference in the mean value of geometry problem solving abilities between the experimental class and the control class.

The difference test between the experimental class and the control class concluded that there was a difference in the mean of students' geometry problem solving abilities between the experimental class that used Lectora Inspire media and the control class that used no special media in learning mathematics. The difference in the experimental class was greater than the control class in this study due to other factors that were not due to the use of Lectora Inspire learning media. This is reinforced by the results of the determination test that only 6.5% of the lecturea inspire learning media have an influence on students' geometry problem solving abilities. While about 93.5% of the success of students' geometry problem solving abilities was influenced by other factors, so it can be concluded that the geometry problem solving abilities of the experimental class were not influenced by the variable use of lectora inspire learning media. Teachers really need 21st Century learning skills to support learning activities in schools (Kartimi, Mulyani & Riyanto, 2019).

In answering the problem formulation and research questions, the research results must be concluded explicitly. Interpretation of the findings is done by using logic and existing theories. Findings in the form of facts in the field are integrated/related to the results of previous research or with existing theories. For this purpose there must be a library. In generating new theories, old theories can be confirmed or rejected, some may need to modify theories from old theories.

4. CONCLUSION

Based on the calculation of the questionnaire description of the lectora inspire assisted learning model, it is known that the student response is 78.13 with a maximum score of 100. The results of the distribution of the lectora inspire learning media questionnaire show that the student response is 78.7 with a maximum score of 100. Based on the calculation of the description of the

mathematics post test, the ability geometry problem solving for experimental class students is higher than the control class, which is equal to 72.75 with a maximum score of 100 and a minimum score of 40. Meanwhile, the description of the mathematics posttest for the control class is equal to 47.47 with a maximum score of 80 and a minimum score of 20. Based on the regression test The influence of Lectora Inspire media on students' geometry problem solving abilities is known that thtiung < ttable or 1.570 < 2.024 so it is concluded that there is no effect of using Lector Inspire media on students' geometry problem solving abilities. Meanwhile the difference test between the experimental and control classes based on statistical tests obtained tcount greater than ttable or 6.245 > 2.024, so it was concluded that there were differences in students' geometry problem solving abilities between the experimental class and the control class.

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