Eduvest – Journal of Universal Studies
Volume 4 Number 12, December, 2024
p- ISSN 2775-3735-e-ISSN 2775-3727

# The Influence of Weblog Media on Increasing Learning Outcomes and Responses Using the Problem Based Learning Model in Buffer Solution Material at SMAN 18 Medan

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**ABSTRACT**

*Lack of media utilization during the learning process can lead to low student learning outcomes. This study aims (1) to determine the effect of increasing higher learning outcomes using weblog media using the Problem Based Learning model rather than using powerpoint; (2) to determine the response to the use of weblog media using the Problem Based Learning model; (3) to determine the positive correlation between response and increased learning outcomes. The sampling technique is purposive sampling. Hypothesis testing was carried out using the right one-party t-test, the results of the study at the significance level = 0.05 showed that tcount > ttable (5.95 > 1.99) so there was an effect of increasing learning outcomes higher using weblog media than using powerpoint. The increase in student learning outcomes of the experimental class was 78.28% and the control class was 52.45%. The response to the weblog media with the Problem Based Learning model was 75.5% in the interesting category. The correlation test of the response to the improvement of student learning outcomes shows rcount> rtable (0.58> 0.27) so there is a positive and significant correlation between the response and the improvement of learning outcomes.*

**KEYWORDS** *Improving Learning Outcomes, Weblog, Problem Based Learning, Powerpoint, Response*



**How to cite:** Anna Juniar, Natasya Laura Marpaung. (2024). The Influence of Weblog Media on Increasing Learning Outcomes and Responses Using the Problem Based Learning Model in Buffer Solution Material at SMAN 18 Medan. *Journal Eduvest*. *4*(12), 12081-12091
**E-ISSN:** 2775-3727

## INTRODUCTION

The quality of education in Indonesia has recently become a major concern. This is due to several problems in the Indonesian education system which cause the poor quality of education in Indonesia. One of them is weaknesses in the field of education management, lack of educational facilities and infrastructure in urban and rural areas, weak government support, low quality of educational resources and weak academic assessment standards.(Fitri, 2021). Efforts that can be made to improve the quality of education in Indonesia are by evaluating everything that is lacking in the field of education, one of which is equal distribution of facilities and infrastructure between rural and urban residents, improving the quality of education and providing higher quality education by designing the learning process so that students are more active. in seeking information and not just focusing on the teacher.

In the 21st century, a change has occurred which is usually called the era of globalization, which is marked by many changes in every aspect of human life. Currently and in the future, the impact of globalization will be increasingly real, one of which is being able to easily obtain information (Redhana, 2019). The era of globalization has had a positive impact on the education sector, in particular the use of computer and internet technology offers many great opportunities and resources for the education sector to improve the learning process.

Buffer solutions are chemical materials that are complex and use a lot of mathematical calculations, so many students have difficulty understanding the material. One of the students' difficulties in buffer solution material is regarding calculating the pH and pOH in buffer solutions using the equilibrium principle, calculating the pH of buffer solutions when adding a small amount of acid or base (Sanjiwani et al., 2018). Based on observations carried out at SMA Negeri 18 Medan, problems were found in chemistry learning, namely low student learning outcomes influenced by the way the teacher delivered material which was still teacher centered and the use of learning media in the form of printed books and power points containing questions resulted in Students often feel bored during learning and sometimes students play with their smartphones and don't listen to the teacher. Therefore, this can affect student learning outcomes. Based on interviews conducted with chemistry teachers at SMA Negeri 18 Medan, the maximum completion criteria (KKM) is 75 and the percentage of student learning outcomes obtained from the three classes XI at SMAN 18 Medan, namely: Class XI MIPA 1 was 48%, class XI MIPA 2 was 39% and Class XI MIPA 3 was 42%.

Efforts that can be made to improve student learning outcomes are the use of appropriate learning media. The use of weblog-based e-learning media can help students to improve good learning outcomes. E-learning is a learning system that can be accessed by students anywhere and at any time via smartphone or computer (Samosir et al., 2019). It is hoped that the use of weblog-based e-learning applications can become a medium to help make learning more interesting and can increase student responses in learning so that it will have a positive impact on improving student learning outcomes. Apart from that, the use of weblog media has the advantage of being able to be accessed anywhere and at any time so that the

student's learning process becomes unlimited and more effective for themselves and others.

The learning model is one of the efforts that educators can make to simplify the learning process so that students are able to understand the learning being delivered and can have a good impact on improving learning outcomes. One learning model that can be used to provide positive responses to students in learning is applying the Problem Based Learning (PBL) learning model because this learning model places more emphasis on the efforts that students can make in finding solutions and being able to solve problems in real life. The interesting thing about the Problem Based Learning learning model is that it is closely related to solving problems in everyday life, especially problems that are close to the students' own lives so that it can foster positive responses from students in analyzing and solving problems (Meilasari et al., 2020).

Previous research findings by (Samosir et al., 2019) showed that there was an increase in student learning outcomes with weblog-based e-learning media and the Jigsaw type cooperative model where there was an increase in experimental class student learning outcomes by 71.3%, while the control class student learning outcomes increased by 71.3%. 62 3%. Furthermore, research by (Simanjuntak, 2022) The use of the PjBL model with weblog media had a higher increase in learning outcomes with an average increase in experimental class learning outcomes of 82.31 and an average increase in control class student learning outcomes of 71.92. Based on research (Warahmah et al., 2021) The use of a problem-based learning model has a better influence than conventional learning on students' critical thinking abilities in buffer solution material with the hypothesis test results obtained being Zcount > Ztabel (1.92 > 1.64 ). Based on these conditions, the aim of this research is

(1) knowing the effect of increasing learning outcomes using the Problem Based Learning model rather than using Powerpoint media on buffer solution material; (2) knowing the response to the use of weblog media that uses the Problem Based Learning model on buffer solution material; (3) knowing the positive and significant correlation between response and improvement in learning outcomes taught with weblog media that uses the Problem Based Learning model in buffer solution material.

## RESEARCH METHOD

This type of research uses quantitative research methods with an experimental research approach in the form of quasi-experimental design (Quasi Experimental Design). The research design used was a pretest-posttest control group design. In this research design there are two groups, each selected using purposive sampling. The experimental group was given treatment using weblog media which used the Problem Based Learning learning model. Meanwhile, the control group was given treatment using Powerpoint media which used the Problem Based Learning learning model. There are research procedures carried out in this research, namely the stages of the research procedure consisting of the preparation stage which includes making observations to obtain the information needed before the research

is carried out, preparing lesson plans, teaching materials/materials as well as weblog and Powerpoint media that will be used for learning during the research, create research instruments and consult with supervisors and validate the instruments.

Then the implementation stage includes giving a pretest to students to determine initial abilities before being given treatment, then carrying out the learning process in both classes, namely in the experimental class using weblog media which uses the Problem Based Learning model and the control class using Powerpoint media which uses the Problem Based model Learning, then provide responses to the experimental class to find out students' responses by using weblog media which uses the Problem Based Learning model and then give post tests to both classes, namely the experimental and control classes to find out what the students' abilities are after treatment. The final stage of implementation is analyzing the data. The method for analyzing learning outcomes data in this research uses the normality test, homogeneity test, hypothesis and gain test

## RESULTS AND DISCUSSION

### Results

Data analysis in this research was carried out statistically, namely by using the right-hand t-test formula. Before carrying out the right-sided t-test, the prerequisite tests are first carried out, namely as follows:

**Table 1.**Normality Test Results of Learning Outcome Data

| Class | Source Data | X2 count | X2 table | $\alpha$ | Information |
|---|---|---|---|---|---|
| Experiment | *Pre-Test* | 10.89 | 11.07 | 0.05 | X2count < X2table |
| | *Post-Test* | 8.43 | 11.07 | 0.05 | X2count < X2table |
| Control | *Pre-Test* | 9.13 | 11.07 | 0.05 | X2count < X2table |
| | *Post-Test* | 10.62 | 11.07 | 0.05 | X2count < X2table |

It can be seen in Table 1. data in the experimental and control classes, by taking the real level$\alpha$= 0.05 and db = 5, namely 11.07, both the pre-test and post-test data all have calculated X2 < X2 table, so it can be concluded that all data can be said to be normally distributed.

**Table 2.**Homogeneity Test Results

| Class | Variance | Fcount | Ftable | A | Information |
|---|---|---|---|---|---|
| Experiment | 46.42 | 1.67 | 1.75 | 0.05 | Data |
| Control | 141.58 | 0.61 | | | Homogeneous |

It can be seen in Table 2. The learning result data obtained is Fcount < Ftable which is based on the table of values for the distribution of F with a real level of α = 0.05 and dk in the numerator 35 (n-1 = 36-1) and dk in the denominator F(35.35) The price obtained F table = 1.75. Because the value of Fcount < Ftable for the experimental class is (1.67 < 1.75) and for the control class (0.61 < 1.75), the learning outcomes data for the two classes are homogeneous.

**Table 3**. Hypothesis Test Results

| | Class Data | tcount | ttable | Information |
|---|---|---|---|---|
| **Experiment** | **Control** | 5.95 | 1.99 | Ha is accepted, Ho is rejected |
| *X*= 87.5 | *X*= 73.88 | | | |
| S = 6.81 | S = 11.89 | | | |
| S2 = 46.42 | S2 = 141.58 | | | |

It can be seen in Table 3. The t distribution data obtained ttable = 1.99, while based on calculations it was obtained tcount = 5.95 so that the price tcount > ttable (5.95 > 1.99). Thus, Ho is rejected and Ha is accepted, which means that the influence of Weblog media which uses the Problem Based Learning model on increasing learning outcomes in buffer solution material is higher than the influence of Powerpoint media which uses the Problem Based Learning model on increasing learning outcomes in buffer solution material.

**Table 4.**Test for Increased Learning Outcomes (Gain)

| Class | Criteria | ∑g | %G | Information |
|---|---|---|---|---|
| **Experiment** | g ≥ 0.70 = High | 0.7828 | 78.28% | Tall |
| **Control** | 0.30 ≤ g < 0.70 = Currently | 0.5245 | 52.45% | Currently |
| | g < 0.30 = Low | | | |

It can be seen in Table 4. So it can be described the difference in the increase in gain results in the experimental class and control class as in Figure 1 below:

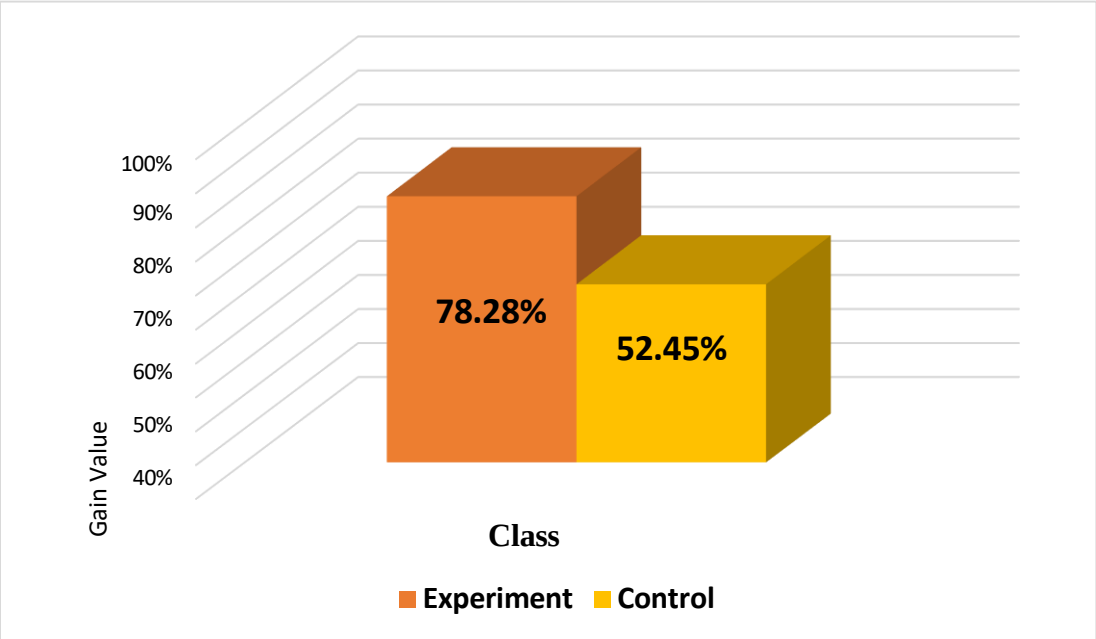


**Figure 1.**Graph of Improvement in Student Learning Outcomes

From the graph in Figure 4.2, it can be seen that there is a difference in the increase in student learning outcomes taught with Weblog media which uses the Problem Based Learning model towards increasing learning outcomes in buffer solution material which is higher than the influence of Powerpoint media which uses the Problem Based Learning model on increasing learning outcomes in solution material. buffer. In the experimental class there was an increase in student learning outcomes by 78.28%, while in the control class there was an increase in learning outcomes by 52.45%.

**Table 5.**Correlation of Response with Improved Student Learning Outcomes

| Data | r count | r table | Information |
|---|---|---|---|
| N= 36 | 0.585 | 0.278 | Ha accepted |
| ∑X = 3150 | | | |
| ∑X2 = 277250 | | | |
| ∑Y = 2176 | | | |
| ∑Y2 = 132902 | | | |
| ∑XY = 191275 | | | |

The correlation test is used to measure how closely the relationship is between two variables. Whether or not the relationship between variable X and variable Y is strong is measured by a value called the correlation coefficient (r). In this research, variable X is the response gain value and variable Y is the gain value for increasing student learning outcomes. The correlation test was carried out in the experimental class.

To find out the correlation between responses and increased student learning outcomes, this is done by calculating the correlation coefficient using the product moment formula. This test is to determine whether the hypothesis in this research is accepted or rejected. The test criteria are r calculated > r table (0.585 > 0.278) then Ha is accepted and Ho is rejected

This research was carried out at SMA Negeri 18 Medan using a sample of two class XI, namely class XI MIPA 3 (as the experimental class) and XI MIPA 1 (as the control class). The treatment given to the two classes was different, where the experimental class was given treatment which was taught using weblog media which used the Problem Based Learning model, while in the control class, the treatment given was with powerpoint media which used the Problem Based Learning model.

Learning was carried out in three meetings, where at the first meeting both classes first carried out a pre-test to determine the students' initial abilities before being given treatment. Furthermore, the material presented at the first meeting was regarding the meaning of buffer solutions and identifying buffer solutions. At the second meeting, the material presented was calculating the pH and pOH of buffer solutions and calculating the pH of buffer solutions by adding a small amount of

acid or base or by dilution. Meanwhile, at the third meeting, the material presented was in the form of the role of buffer solutions in the bodies of living creatures, where after explaining this material, students also carried out a post-test.

In its implementation, the use of the Problem Based Learning model has phases that must be carried out, in this research the first thing carried out is providing orientation about problems to students by means of teachers discussing learning objectives, describing and giving students direction to students to be involved in problem solving activities. Second, organizing students to research by means of teachers helping students to define and organize learning tasks related to their problems. Third, help students investigate independently or in groups by collecting appropriate information, carrying out experiments and looking for explanations and solutions. Fourth, developing and presenting work results by teachers helping students in planning and preparing appropriate work results such as reports and videos and helping them to share assignments with others. Fifth, teachers help students to reflect or evaluate the investigations and processes they use. Based on research that has been conducted (Indriyani et al., 2023) entitled "Improving Student Learning Outcomes on Buffer Solution Material through the Problem Based Learning Model" in this research the results of research conducted on buffer solution material in class XI MIPA 1 SMA Negeri 5 Bengkulu City, it was found that the application of the Problem Based Learning learning model to buffer solution material has provided an increase in student learning outcomes. There was a significant increase in students' classical learning outcomes from cycle I to cycle II. This increase reached 23.3%, with the percentage of classical learning outcomes increasing from 63.1% in cycle I to 86.4% in cycle II, where this research shows that the use of the Problem Based Learning model has enormous potential to provide experience. learning more interesting and meaningful. Apart from that, the Problem Based Learning model also facilitates students to carry out investigations, solve problems and this learning model also designs students' thinking abilities to be more critical and creative which will direct students to feel interested in solving the problems given.

Based on data analysis on improving learning outcomes, both pretest and posttest data were normally distributed. This is demonstrated through the normality test. The normality test is carried out as a condition used in parametric statistical analysis. This normality test is used to find out whether the data we obtain comes from a normally distributed population (Khumairah et al., 2020). It can be said that normally distributed data is data that is neither too big nor too small. From this research, it was obtained for the experimental class 10.89 and 8.43 and for the control class 9.13 and 10.62. In the experimental and control classes, the calculated chi square data was smaller than the table chi square, namely 11.07.

Based on the statistical homogeneity test, namely using the Fisher test (F-test), it was found that for both classes, for data in the experimental class, the F count was 1.67 and in the control class it was 0.61. Meanwhile, the Ftable value is 1.75. So it can be concluded that the value data in both classes is homogeneous

because the Fcount < Ftable value. The homogeneity test is carried out after it is known that the data is normally distributed. This homogeneity test was carried out to determine that the two groups of data came from a homogeneous population by comparing the variance values of the two data (Kartini et al., 2021). The homogeneity test is carried out to avoid differences in data obtained that does not come from inhomogeneous data. In this research, it was found that the data for the two class samples came from a homogeneous population.

Based on the hypothesis test, it was found that the tcount value was 5.95 while the ttable value was 1.99. So the value of tcount>ttable, where it can be concluded that the alternative hypothesis (Ha) is accepted which shows that the increase in student learning outcomes on the subject of buffer solutions using weblog media which uses the Problem Based Learning model is higher than the influence of Powerpoint media which uses the Problem model Based Learning on increasing learning outcomes in buffer solution material with an increase in learning outcomes (gain) in the experimental class, the gain percentage was 78.28%, which is included in the high category, while in the control class, the gain percentage was 52.45%, which is where included in the medium category.

Based on research conducted (Marbun & Kembaren, 2023) entitled "Using the Problem Based Learning (PBL) Model with Powerpoint Media to Improve Chemistry Learning Activities and Outcomes in Buffer Solution Material" in the findings of the t-test results for learning outcomes obtained tcount > ttable (23.02 > 1.68) which shows Ho is rejected and Ha is accepted, namely the application of the PBL model with Powerpoint media to improve student learning outcomes. According to (Nurlaili et al., 2023) entitled "The Influence of the Problem Based Learning (PBL) Model Assisted by LKPD Oriented to Daily Life on Learning Outcomes in Class XI Science Buffer Solution Material at SMAN 1 Praya Timur" the results of data analysis obtained class N-Gain experimental 0.679 is greater than the N-Gain of the control class, namely 0.596 and tcount (2.107) > ttable (1.999) at the 5% significance level. The results of the N-Gain test show that there is an increase in learning outcomes, and the t-test results show that the use of the PBL model assisted by LKPD has a significant effect. The results of the research concluded that learning using the Problem Based Learning (PBL) model assisted by LKPD which was oriented towards daily life had a positive (better) influence on the learning outcomes of chemistry material for class XI IPA at SMAN 1 Praya Timur.

Based on the results of the analysis of student responses to weblog media using the Problem Based Learning model with the help of a response questionnaire using a Likert scale, it was found that the percentage value of the student response questionnaire before treatment was 47.53% less interesting, whereas after treatment with this media it was 75 , 55% fall into the interested category. This can be concluded based on (Dewi et al., 2022) regarding the scale of achievement levels regarding media responses, so the media is said to be suitable for application in the learning process.

Correlation test data between responses and increased learning outcomes in the experimental class obtained a correlation coefficient value of rcount = 0.5853 while the r table in$\alpha$=0.05 (N=36) is 0.2785. Because rcount > rtable then Ho is rejected which means Ha is accepted. This means that there is a positive and significant correlation between responses and increased student learning outcomes. Based on research conducted (Trifiani et al., 2022), the results obtained from the relationship between applying the discovery learning approach to learning outcomes can be seen in the results of manual statistical calculations, the correlation value between x and y is 0.40 and is included in the very good category.

## CONCLUSION

The results of the research show that there is an influence on increasing student learning outcomes on the subject of buffer solutions using weblog media which uses the Problem Based Learning model which is higher than the influence of Powerpoint media which uses the Problem Based Learning model on increasing learning outcomes on buffer solution material with an increase in learning outcomes. in the experimental class it was 78.28% and in the control class it was 52.45%. The results of the analysis of student responses to weblog media using the Problem Based Learning model with the help of a response questionnaire showed that the percentage before treatment was 47.53% and after treatment with this media it increased by 75.5%, so the media was concluded to be suitable for application in the process. learning.

There is a correlation between responses and increased learning outcomes in the experimental class, an r count of 0.58 with an r table of 0.27, where there is a positive and significant correlation between responses and increased student learning outcomes. Based on the conclusions from the research results, the author suggests that teachers or prospective teachers are advised to apply weblog media with the Problem Based Learning model as an alternative learning to improve learning outcomes and student responses because in its implementation learning is student-centered so that students become active during the learning process ongoing and for future researchers who want to research further regarding Problem Based Learning learning, it is best to consider using additional media in learning to obtain better and more efficient results.

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