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The Influence of Problem Based Learning Weblog on Students Motivation and Learning Outcomes on Thermochemical

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Abstract: This research aims to determine the influence of weblog media using the problem-based learning model on student motivation and learning outcomes on thermochemical material. This research was conducted at SMAN 1 Percut Sei Tuan in the 2023/2024 academic year. Sample determination was carried out using a purposive sampling technique. The sample consisted of 2 classes, namely class XI-Matlanko 2 as an experimental class (30 students) which was taught using Weblog media and class The instruments used are test instruments to measure learning outcomes and non-test instruments to measure learning motivation. The results of this research indicate that there is an influence of using a weblog using a problem-based learning model on student learning motivation by testing the sig hypothesis. $0.00 < \alpha (0.05)$ and there is also an influence of using a weblog using the problem-based learning model on student learning motivation with hypothesis testing sig. $0.00 < \alpha (0.05)$. Apart from that, there is a correlation between learning motivation and student learning outcomes who are taught using weblog media using the problem-based learning model with sig. $0.00 < \alpha (0.05)$ and Pearson correlation 0.953 with the high category.

Keywords: Problem Based Learning; Weblog; Thermochemical

INTRODUCTION

Education is a means for humans to develop their potential through the learning process they gain. In the 1945 Constitution, Article 31 Paragraph 1, it is stated that: "every citizen has the right to education". Education is a right and obligation for every school, one of the main activities in the educational process at school is learning activities. Chemistry learning is an important aspect of educational operations, so that the quality of learning chemistry must be continuously developed and perfected (Pane & Dibyantini,

2023). The quality of education in a country is one of the determinants of that country's progress. In other words, the progress of a country can be seen from the quality of education in that country. Indonesia is a country that really cares about the implementation of education. Various efforts have been made by the government to ensure the continuity of education for the better (Kurniawati, 2022). In responding to the sustainability of education in Indonesia, the government is trying to take strategic steps in optimizing learning, namely by implementing the curriculum.

The curriculum is a reference in responding to problems that occur in education in Indonesia (Suhandi & Robi'ah, 2022). The curriculum has a role in developing learning designs and ideas which aim to be a guide in achieving educational goals (Marpaung & Pongkendek, 2021). In Law No. 20 of 2003 Chapter 1 Article 1 it is said that "curriculum is a set of plans and arrangements regarding objectives, content and learning materials as well as methods used as guidelines for implementing learning activities to achieve certain educational goals" (Vhalery et al., 2022). The development of the education curriculum in Indonesia has reached the development of the Independent Curriculum.

The Independent Curriculum is education that is based on the nature of nature and the times, where each student has their own talents and interests. The idea of the essence of independent learning is to create a pleasant learning atmosphere without feeling burdened to achieve certain grades (Cholilah et al., 2023). The concept of an independent learning curriculum is the formation of freedom in thinking, learning to integrate literacy abilities, knowledge skills, skills and attitudes as well as mastery of technology. In the independent curriculum, there are several learning models applied in learning, namely Problem Based Learning (PBL), Project Based Learning (PJBL), Inquiry Learning and Discovery Learning (DL).

Problem Based Learning is a form of learning that is oriented to the student learning process (student-centered learning). Problem Based Learning focuses on presenting a real problem to students, then students are asked to find a solution through a series of research based on theories and principal concepts they have learned from various sciences. Problems are the focus, stimulus and guide of the learning process, while the teacher is the facilitator and guide (Mayasari et al., 2022).

Many findings related to problem-based learning have been made. The PBL learning model can be said to be a learning process that challenges students to study in

groups to find solutions to real world problems and then be required to solve these problems (Rombe et al., 2021). The problem-based learning model is a teaching and learning process that provides contextual problems, so that students are stimulated to learn. Problems are faced before the learning process takes place so that it can trigger students to research, describe and find solutions to the problem (Ardianti et al., 2021). The application of the PBL model requires a medium in the learning process, one of which is weblog media.

The characteristics of the Problem Based Learning model are: (1) Problems become the starting point in learning; (2) Problems challenge students' knowledge, attitudes, and competencies which then require identification of learning needs and new areas of learning; (3) Utilization of various sources of knowledge, use, and evaluation of information sources is an important process in PBL; (4) Learning is collaborative, communication, and cooperative; (5) Developing inquiry and problem solving skills is as important as mastering the content of knowledge to find solutions to a problem; (6) PBL involves evaluating and reviewing students' experiences and learning processes (Ramadhana & Sutiani, 2023).

In the teaching and learning process, media presence has sufficient meaning important. Because in these activities lack of clarity in the material presented to students can be simplified with the help of the media. Thus, students are easier to digest ingredients with using media rather than without help media (Tambunan et al., 2021).

One interesting media that can be used in learning is Weblog media. A blog is a form of web application that resembles writings (which are published as posts) on a public web page (Sephiani & Nusantari, 2020). Weblog or what are usually called teacher blogs can upload all information related to the learning material being taught by adding multimedia (images, animations, sound effects and videos) to make it interesting and easier for

students to understand and learn (Rohmawati et al., 2018). There is a good opportunity that blogs can be a means or tool to help the learning process, especially in chemistry learning. Many abstract concepts for students can be presented in computer simulations. Material and exercises can be completed by students when they solve problems. For the continuity of a learning process, student motivation is needed before learning.

Learning motivation is one of the factors for student success in achieving maximum learning outcomes. Students who have high motivation to learn will be better at accepting lessons or the attitudes generated by students will be more positive in learning (Antara, 2022). A person's motivation can be influenced by 2 things, namely internal factors and external factors. Factors from within a person (internal) include physical, attitudes, interests, talents and emotions, while factors from outside a person (external) include family, school, community and living environment (Djarwo, 2020). When student motivation in learning is very high, it will affect learning outcomes.

Students who learn to change their behavior are motivated by learning on an internal and external level, usually with some encouraging indicators or features (Uni, 2016). The traits of learning motivation are: (a) diligence in completing tasks; (b) tenacity in the face of difficulty; (c) interest in a variety of adult issues; (d) preference for working alone; (e) ability to defend one's position; (f) difficulty in letting go of one's beliefs; and (g) enjoyment of problem solving (Panggabean et al., 2023).

Learning outcomes are defined as benchmarks for achieving learning goals set for students who take part in a series of learning. The importance of good student study habits to improve learning outcomes has been proven by several researchers (Hijriyati et al., 2022). Student learning outcomes are achievements achieved by students academically through exams and assignments, active asking and answering questions that support the acquisition of these learning

outcomes. In academic circles, the idea often arises that educational success is not determined by a student's grades listed on a report card or diploma, but the measure of success in the cognitive field can be determined through a student's learning outcomes (Somayana, 2020).

Abstract chemical concepts are explanations for concrete chemical concepts. The generally abstract characteristics of chemistry are one of the factors that students consider chemistry to be a difficult subject to understand (Lestari & Muchlis, 2021). Chemistry is a subject that has a high level of urgency. One of the topics discussed in chemistry in class XI SMA is thermochemistry. Thermochemistry is a branch of chemistry that studies the energy that accompanies chemical reactions (Kurnia et al., 2022). Important concepts in thermochemistry begin with studying the types of energy and the nature of energy, in principle energy can be converted from one form of energy to another. Thermochemistry is the study of energy changes in chemical reactions. It can be seen that most reactions are endothermic (absorb heat) and some are exothermic (release heat) (Fatah et al., 2021).

Furthermore, because of the vast influence of chemistry on various fields of science, such as technology, agriculture, health, and fisheries, chemists are also vital to be studied and understood conceptually, factually, and procedurally. Experiences or exercises that include physical and psychological components influence learning, resulting in stable behavioral change (Munthe & Suyanti, 2024).

Thermochemical material was chosen because this material is a material that is quite difficult for students to understand because this material contains calculations and concepts. Thermochemical material is abstract material and difficult to understand, especially concepts such as systems and environmental materials (Siagian & Yasthophi, 2021).

Based on the results of observations I made at SMA Negeri 1 Percut Sei Tuan, in the learning process students often take different ways to understand the subject matter. There are some students who monotonously take notes on what the teacher explains and writes down, there are also some students who are enthusiastic and involved in questions and answers in class during the learning process and there are even students who rarely ask the teacher and are busy with their cell phones. If we look at the student learning outcomes, especially in Thermochemistry material in the previous academic year, the learning outcomes of class Meanwhile, students who have not reached 60% have a chemistry KKM score of 80. The low learning outcomes of students are influenced by the teacher-centered learning model which causes students not to be actively involved in the teaching and learning process. Apart from learning models, it turns out that the use of media at SMAN 1 Percut Sei Tuan is still minimal, especially electronic media or media that utilizes the internet. Lack of ability and interest of students in the learning process so that students' learning motivation tends to be less enthusiastic about learning, this makes students less interested in the material being taught.

METHODS

This research was carried out at SMA NEGERI 1 Percut Sei Tuan and the research period was carried out for 6 months starting from November – April. This specified time is used for observation, making proposals, collecting data, research results and making research results reports. The population in this study were class The sample used in this research was 2 classes, each class consisting of 30 students. Sampling was carried out using purposive sampling technique. The purposive sampling technique is purposeful sampling. Where XI Matlanko 2 has low learning outcomes and XI Matlangraf has higher learning outcomes compared to class This type of research includes experimental research. The design of this research can be seen below.

RESULTS AND DISCUSSION

A. Learning Motivation Data

After administering the learning motivation questionnaire, the mean value of student motivation in the experimental and control classes can be seen in Table 1.

Table 1. Learning motivation data

Data	Class	
Mean Learning Motivation	Experiment	Control
	70.36	61.6

From the calculation results showed that the Experiment class which was taught using weblog media using the problem-based learning model had a mean of 70.36, while the control class which was taught using PPT media using the problem-based learning model had a mean of 61.6. The motivation value of experimental class students is higher than the motivation value of control class students.

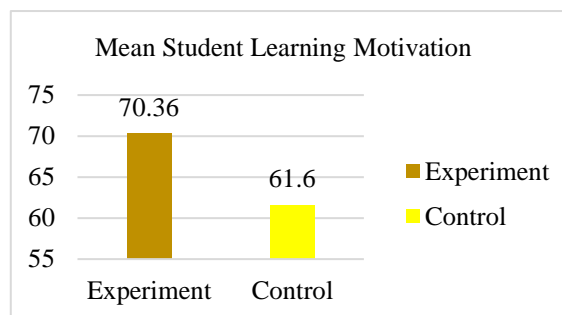


Figure 1. Mean student learning motivation

B. Learning Outcome Data

Pretest and posttest data in the experimental and control classes can be briefly seen in Table 2.

Table 2. Learning outcome data

Class	Mean	
	Pre-test	Post-test
Experiment	48.8	84
Control	56.3	78

From the table above, it can be seen that the mean pre-test and post-test scores for the experimental class taught using weblog media using the problem-based learning model are 48.8 and 84, while the mean pre-test and post-test scores for the control class taught using ppt media using the problem-based learning model were 56.3 and 78. The experimental class learning outcomes were

higher than the control class learning outcomes.

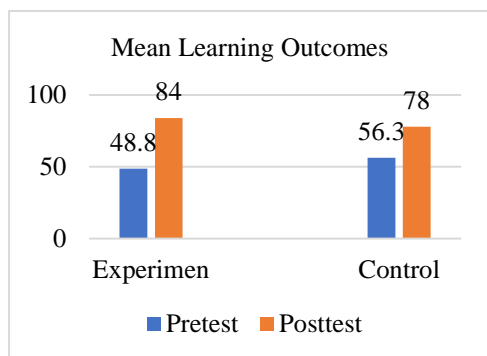


Figure 1. Mean learning outcomes

Research Data Analysis

A. Normality Test

Test data normality is carried out to determine whether the data used is normally distributed or not. The normality test in this study was the Shapiro Wilk test using SPSS 25 for Windows with a significance level of 5% or 0.05. Data is said to be normally distributed if the sig value $> \alpha$ (0.05) and vice versa. Data from the Learning Motivation normality test results can be seen in table 3.

Table 3. Student motivation normality test

Class	Sig.	α	Explanation
Experiment	0.126	0.05	Normally distributed
Control	0.063	0.05	Normally distributed

The data in Table 3 shows that the significance level of learning motivation values for the experimental class and control class respectively has a significance value of 0.126 and 0.063, which means $\text{sig} > \alpha$ (0.05), so it can be concluded that the data is normally distributed.

Apart from testing the normality of learning motivation, learning outcomes also need to be tested for normality. Data normality was tested with SPSS 25 for Windows using the Shapiro Wilk test with a significance level of 5% or 0.05. Data is said to be normally distributed if the sig value $> \alpha$ (0.05) and vice versa. Data from the Learning Motivation normality test results can be seen in table 4.

Table 4. Normality test of learning results

Class	Data	Sig	A	Explanation
Experiment	Pretest	0.136	0.05	Normally distributed
	Post test	0.056	0.05	Normally distributed
Control	Pretest	0.219	0.05	Normally distributed
	Post test	0.067	0.05	Normally distributed

From table 4 shows that student learning outcomes in the experimental class and control class originating from the pretest and posttest results have significance $> \alpha$ (0.05). So, the data can be stated to be normally distributed.

B. Homogeneity Test

Test data homogeneity can be done to find out whether the data used is homogeneous or not. The homogeneity test was carried out with the Levene test, using SPSS 25 for windows, at a significance level of 0.05. If the sig value $> \alpha$ 0.05 then the data is said to be homogeneous, conversely if the sig value $< \alpha$ 0.05 then the data is said to be heterogeneous. The homogeneity test results can be seen in table 5.

Table 5. Test of homogeneity of learning motivation

Student Learning Motivation	Sig		Explanation
	Mean	Median	
	0.138	0.139	Homogeneous Data
			Homogeneous Data

Based on the data in table 5, a significance value of $0.138 > \alpha$ (0.05) is obtained, which means that the learning motivation data in the experimental and control classes is homogeneous. It can be concluded that learning motivation in the experimental and control classes is homogeneous. Next, the homogeneity of learning outcomes was tested with the SPSS 25 for Windows program using the Levene test at a significance level of α 0.05. Where data is said to be homogeneous if the significance value is $> \alpha$ 0.05. Data from the homogeneity test of learning outcomes can be seen in table 6.

Table 6. Test the homogeneity of learning results

	Sig		Explanation
	Mean	Median	
Learning Outcomes	0.350	0.474	Homogeneous Data

Based on the data in table 6, a significance value of $0.350 > \alpha (0.05)$ is obtained, which means that the learning outcomes data in the experimental class and control class are homogeneous.

C. Hypothesis Testing

If the data obtained is normally distributed and homogeneous, then hypothesis testing can be carried out using SPSS 25 for Windows with the Independent Sample t Test with a significance level of $\alpha (0.05)$. If the sig price $< \alpha (0.05)$ then H_a is accepted, whereas if the sig price $> \alpha (0.05)$ then H_a is rejected.

1. Hypothesis Test I

Data from Hypothesis I test calculations can be seen in Table 7.

Table 7. Hypothesis test I

Class	Mean (%)	Standard deviation	Sig (2-tailed)	α	Explanation
Experiment	70.37%	7.034	0.000	0.05	H_a accepted
Control	61.6%	9.160	0.000	0.05	H_a accepted

The data in Table 7 is the result of data processing using SPSS 25 for Windows, the Sig value is obtained. = 0.000 where the Sig value. $< \alpha (0.05)$, it can be concluded from hypothesis I that H_a is accepted and it is stated that there is an influence of weblog media using the problem-based learning model on student learning motivation.

2. Hypothesis Test II

Data from the results of Hypothesis II test calculations can be seen in Table 8.

Table 8. Hypothesis test II

Class	Mean (%)	Standard deviation	Sig (2-tailed)	A	Explanation
Experiment	84%	6.486	0.001	0.05	H_a accepted
Control	78%	7.381	0.001	0.05	H_a accepted

The data in Table 8 is the result of data processing using SPSS 25 for Windows, obtained a Sig value. = 0.001 where the Sig value. $< \alpha (0.05)$, it can be concluded from

hypothesis I that H_a is accepted and it is stated that there is an influence of weblog media using the problem-based learning model on student learning outcomes.

3. Hypothesis Test III

Data hypothesis III test calculation results can be seen in Table 9.

Table 9. Hypothesis test III

Class	Pearson Correlation	Sig(2-tailed)	α	Explanation
Experiment	0.953	0.000	0.05	H_a accepted

Based on the data in Table 9, the results of data processing using SPSS 25 for Windows to test Hypothesis III in the experimental class obtained a Sig. = 0.000 where the Sig value. $< \alpha (0.05)$, with the r value (correlation coefficient) obtained being 0.953, which means the correlation is very strong. Thus, it can be said that H_a is accepted. This shows that there is a correlation between motivation and learning outcomes taught using Weblog media using the PBL model.

CONCLUSION

Based on research that has been conducted, the use of weblog using the Problem Based Learning model in the learning process can increase student motivation and learning outcomes in class. The learning motivation of students who are taught using Weblog media using the PBL model is higher than the learning motivation of students who are taught without using Weblog media in learning thermochemical material. It can be seen from the average value (mean) in the experimental class and control class, respectively 70.36 and 61.6. So, the increase in the average value of student learning motivation was 8.76. Likewise with student learning outcomes, the average (mean) posttest score in the experimental class and control class is 84 and 78 respectively. So, the increase in the average score of student learning outcomes is 6. And there is a positive and significant correlation between learning motivation and results. student learning is taught using Weblog media using the PBL model with a significance value = 0.00 with a Pearson correlation of 0.953, meaning the

correlation is very strong. This shows that the use of Weblog using a problem-based learning model on thermochemical material can increase student motivation and learning outcomes.

Other research that has been carried out by other researchers regarding the application of website-based learning to improve student learning outcomes states that Google Classroom-based E-Learning media to improve student learning outcomes states that Google Classroom-based E-Learning media can improve student learning outcomes and make it easier. learning process. The research results are supported by data which shows the average score before using the Google Classroom-based E-Learning learning media was 72.9, whereas after using the Google Classroom-based E-Learning learning media the average score was 85.5. So, the increase in the average class score was 12.6

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