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THE EFFECT MODEL *PROBLEM BASED LEARNING* (*PBL*) *POWERPOINT* MEDIA USING THE RESULTS STUDENT LEARNING ON THE COST OF DISCUSSION REDOX REACTIONS IN CLASS X

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Abstract- This study aims to determine whether improving student learning outcomes are taught using *Problem Based Learning* model with the media PowerPoint is higher than the increase in student learning outcomes are taught without using the model of Problem Based Learning with media PowerPoint as well as to determine the level of cognitive most growing with the use of models PBL. Sampling was done by purposive sampling by taking two classes of class X PMIPA-3 and as a class experiment and X PMIPA-5 as the control class. The instrument used to determine student learning outcomes is an objective test in the form of 20 multiple-choice questions that tested the validity, level of difficulty, power differentiator, distractors, and reliability. Price r_11 obtained at 0.80 and price r_{tabel} = 0.423. Overall reliability of the test is said to be reliable because $r_{calculate} > r_{table}$. After the pretest and posttest and data processing of the obtained $\chi 2_{Calculate}$ 9.80 pre-test and post-test $\chi 2_{Calculate}$ 6.30 for classroom experiments and $\chi 2_{Calculate}$ 6.20 pre-test and post-test $\chi 2_{Calculate}$ 8.60 for the control class as well as the value $\chi 2_{Table}$ amounting to 11.07. Because $\chi 2_{Calculate} < \chi 2_{Table}$ the normal distribution of data. At the homogeneity test $F_{calculate} < F_{table}$, ie 1.858 to 1.387 < pretest value, 1.858 to 1.408 < posttest value, and 1.261 <1.858 for a gain so that the data homogeneous. Gain learning outcomes in the experimental class 0.8186 (81.86%), gain control of the learning outcomes in grade 0.6015 (60.15%). Based on the results of testing the hypothesis improving student learning outcomes obtained $t_{Calculate}$ price> t_{table} α is 9.9132> 1.6723 with a significance level (α = 0.05) so that Ha is accepted and it can be concluded that the result of learning using *Problem Based Learning* model by using the media *PowerPoint* higher compared with the results of learning without using *Problem Based Learning* model using *PowerPoint* media. In addition, acquired also increase students' cognitive, namely the level of knowledge (C1) amounted to 66.67%, of understanding (C2) of 79.78%, the application (C3) amounted to 62.55%, and for analysis (C4) of 77.22 %.

***Keywords*:** problem based learning, learning outcomes, redox reactions

1. TRODUCTION

Education is one of the manifestations of human culture that is dynamic and full development. Therefore, changes or educational development is that it should happen in line with the changing culture of life. Changes in the sense of improving education at all levels should continue to be done in anticipation of future interest [9]. One of the problems facing our education is a problem of weak learning process. In the learning process, children are less encouraged to develop the ability to think. The learning process in the classroom directed to the child's ability to memorize information. The learning process still gives the dominance of teachers and not provide access for students to develop independently through the discovery and the process of thinking. Students just memorize concepts and are less able to use these concepts if you see a problem in real life associated with its concept [8].

Based on interviews with a chemistry teacher at SMAN 2 Kabanjahe stated that the KKM class X is 70 and still a lot of students who do not meet the KKM. When the learning process takes place, students tend to be passive so that the study results were not optimal because most teachers still use the chemical conventional learning models. The learning model is more centered on the teacher cause chemistry student participation in learning low impact on learning outcomes is low. In addition, teachers are still rarely using instructional media in delivering course material. Teachers are less creative in creating instructional media in accordance with the material even less use of the media read and electronic media available in schools.

Difficulties students' interest towards chemistry lessons can be due to two factors, namely internal factors derived from the student and external factors that come from outside the student. Internal factors is influenced by three factors: physical factors, psychological, and fatigue. While external factors that affect student learning is the family factor, the environment, and society [7].

From the above problems need to be a strategy or model of learning so that students gain an ease and pleasure in studying chemistry. Teachers as educators should be able to create a conducive learning process meaningful and appropriate learning methods are used, must also be able to increase the interest and motivation of student learning. There are several kinds of approaches and methods that can be used to enhance the activity and student learning outcomes, one of which is using the model of *Problem Based Learning* (PBL). PBL is one approach to student-centered learning. According [5], PBL learning model is a model that involves students to solve problems through the stages of scientific methods so that students can learn the knowledge related to these issues and have the skills to solve problems. This model stimulates the development of students' ability to think creatively and thoroughly, because in the process of doing a lot of mental student learning by highlighting the problems from various aspects in order to find a solution.

According Killey [6], PBL has advantages in helping students sort out the problems (abstraction), define the problem (problem definition), and resolve problems (refinement), helps develop critical thinking, verbal communication and writing and developing group work , In PBL students be held accountable for the education they live, as well as directed to be less dependent on the teacher, to form an independent student to continue the learning process on the lives and careers which they live.

The concept of redox reactions is one of the high school chemistry teaching material in the second half of the theoretical and the development of the concept so quickly from the concept of binding and release of oxygen, receipt and release of electrons, as well as the increase and decrease in oxidation.

Effective learning requires good planning. The media used in the learning process also requires good planning. The medium of learning chemistry has several functions, including: (1) learning media can overcome the limitations of experience owned by learners, (2) learning media can transcend the limits of the classroom, (3) learning media allow for a direct interaction between the learner and his environment , (4) media produce uniformity observations, (5) the media can instill basic concepts are true, concrete and realistic, (6) the media arouse desire and new interests, (7) media to encourage motivation and stimulate children to learn, and (8) media provide an integral experience / thorough from the concrete to the abstract [3]. One medium that is often used in the study is the media *PowerPoint*. *PowerPoint* is a program presentation applications that provide information in audiovisual so that students are able to absorb information by seeing, hearing and responding to the ability to remember each student so that the message information is visually easy to understand, better stimulate students to find out information about the teaching material that is being presented , the object is displayed visible concrete (real), presenting a varied so as to make the learning process does not saturate.

Based on the above, then do the research with the title: The Effect Model *Problem Based Learning* (PBL) Using *PowerPoint* Media Against Student Results Highlights In Redox Reactions in Class X. This study aims to determine 1) Is improving student learning outcomes through the model PBL with media PowerPoint higher than conventional models with media PowerPoint on the material redox reactions in class X, 2) cognitive aspect that most growing of the use of the model PBL with media PowerPoint on subject of redox reactions in class X, 3) How much improving student learning outcomes on the subject of redox reactions with the use of PBL models using PowerPoint media.

2. METHODS

This research was conducted at SMAN 2 Kabanjahe. When the study in April-May in the tenth grade second semester of the school year 2014/2015. The subjects were students of class X MIA 3 and X MIA 5. The sampling technique is purposive sampling done. To collect data using the cognitive test of 20 multiple choice questions. Learning instruments include syllabi, lesson plans and worksheets based PBL. Instruments data acquisition and assessment instruments include cognitive, affective and psychomotor.

Analysis techniques of instrument test evaluation of knowledge use: 1) Test the validity of the test formula product moment correlation, 2) test the reliability of using formula Kuder Richardson (KR-20), 3) Test the level of difficulty is determined on the number of students who answered

correctly items than all the students who followed the test, 3) Test distinguishing, determined from the proportion of the test group over can answer correctly.

Data analysis technique consists of normality test, homogeneity test, test hypotheses and test learning outcome. The method used in this study is the experimental method with a design pretest-posttest control group design. The research design used contained in Table 1.

Table 1. Research design

Class	Pretest	Treatment	postest
Experiment	T1	X	T2
Control	T1	Y	T2

Description :
X= Teaching with Problem Based Learning models using PowerPoint.
Y= Teaching with conventional learning models and media PowerPoint.
T_1 = Initial test
T_2 = final Test

3. RESULTS AND DISCUSSION

3.1. Data Learning Outcomes

The result is the ability to learn the skills, attitudes and skills obtained by the students after receiving the treatment given by the teacher so that they can aplly that knowledge in everyday life [4]. To determine the learning outcomes of students who are taught by *Problem Based Learning* models using *PowerPoint* media then conducted a study of high school students of Class X the second half. In each of the first class given initial test (pre-test) which aims to determine the initial ability of students, while the post-test carried out after the student is given the treatment.

From calculations based on the data tabulation of the results of the second test sample values obtained pre-test and post-test experimental and control classes are summarized in Figure 1.

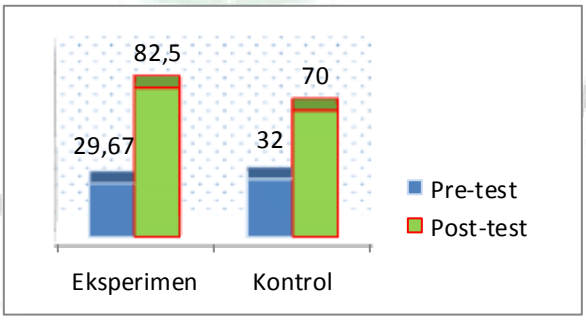

Figure 1. Diagram Results Average Pre-test and post-test samples

From the data it can be seen that there is a good learning outcome in the experimental class and the control class. Postest value can be enhanced by giving treatment learning model that is performed by teachers which results in the post test experimental group was higher than the control class. And this shows that the model of *Problem Based Learning* with *PowerPoint* media contribute in improving learning outcomes in the experimental class and better than the conventional classroom learning.

From the diagram above, the average result of pre-test experimental class was 29.67 and the average pre-test control group was 32.00 and the average post-test experimental class and control class is 82.50 70.00.

3.2 Improved Learning Outcomes

Based on the calculation of the normalized gain both classes of samples concluded that the experimental class there is a category of high gain as many as 29 students, the gain was as much as 1 students. While in the classroom there is a category of high-gain control of as many as three students, the gain was as many as 27 students. From the analysis of yield increase student beajar it can be summarized in Figure 2.

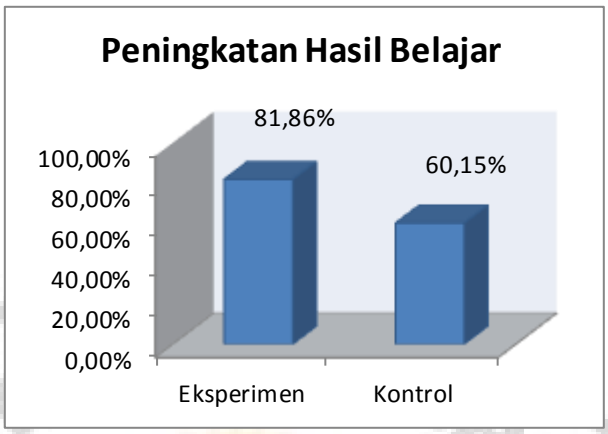

Figure 2. Diagram Results Average Gain Sample

Based on the Figure above, the data showed an increase in learning outcomes for the experimental class amounted to 81.86% and 60.15% for the control classes. Improved learning outcomes experimentation class classified in the category of high-class control while learning outcome was moderate. Gain results obtained each class represents the difference between the increase in the pretest posttest results obtained by students. Percent gain in the experimental class is greater than the control class this is because the learning outcomes obtained after the conducted study conducted in experimental class is higher than the learning outcomes obtained in the control class so that it can be concluded that the model of *Problem Based Learning* by using media PowerPoint on the subject matter of redox reactions can improve student learning outcomes that students gain also increases.

3.3 Test Normality and Homogeneity

Before testing the hypothesis, the data obtained should qualify that is normally distributed and homogeneous. Then tested for normality and homogeneity of the research data. Based on the test results of normality in the pre-test and post-test data obtained as follows:

Table 2. Data Normality Pre-test and Post-test

Class	Data Source	$\chi^2_{Calculate}$	χ^2_{Table}	α	Remarks
Experiment	Pre-test	9,80	11,07	0,05	Normal data
	Post-test	6,30	11,07		Normal data
	Gain	10,85	11,07		Normal data
Control	Pre-test	6,20	11,07	0,05	Normal data
	Post-test	8,60	11,07		Normal data
	Gain	10,75	11,07		Normal data

Because the value $\chi 2_{Calculate} < \chi 2_{Table}$ the data obtained for the experimental class and control normal distribution.

Homogeneity test aimed to see whether the data derived from different samples are homogeneous. Based on the calculation of the homogeneity test of the data pre-test and post-test of the second sample is obtained the following data:

Table 3. Homogeneity Data Pre-test and Post-test

Data	Class	S^2	$F_{calculate}$	F_{table}	Remarks
Pre-test	Experiment	94,71	1,387	1,858	Homogeneous data
	Control	68,27			
Post-test	Experiment	46,12	1,408	1,858	Homogenious data
	Control	32,75			
Gain	Experiment	0,0065	1,261	1,858	Homogenious data
	Control	0,0082			

S_2 = variance samples; F_{table} = dk (n-1), (n-1) ($\alpha = 0.05$)

From the data in the table shows that the value data for the pretest and posttest value of F indicates a smaller number than the F table, ie 1.858 to 1.387 < pretest value, 1.858 to 1.408 < posttest value, and 1.261 <1.858 for gain. From Table 4.5 it can be concluded that the value of the pretest and posttes the experimental class and control class is homogeneous.

3.4. Hypothesis Test

Having in mind that the data is normally distributed and homogeneous, it can test the hypothesis by using statistical test which one party t-test using data normalized gain with significance level α = 0.05. This test is used to determine whether this hypothesis is accepted or rejected. Testing criteria if t count> t table α then the alternative hypothesis (Ha) is accepted and the null hypothesis (Ho) is rejected. Data calculation results of hypothesis testing can be seen in Table 4.

Table 4. Hypothesis Test Result

Data	Class	g	S^2	$T_{calculate}$	T_{table}	Remarks
Gain Experimental Learning Outcomes	Eksperimen	0,8186	0,0065	9,9132	1,6723	(Ha) accepted
	Control	0,6015	0,0082			

Based on the results of testing the hypothesis improving student learning outcomes obtained $t_{calculate}$ price> t_{table} α is 9.9132> 1.6723 with a significance level ($\alpha = 0.05$) so that Ha is accepted and it can be concluded that the result of learning using *Problem Based Learning*model by using the media *PowerPoint* higher compared with the results of learning without using *Problem Based Learning* by using *PowerPoint* media.

3.5. Analysis of Cognitive Domains

To determine the cognitive aspects growing of classes that are given learning by using *Problem Based Learning* model by using the media *PowerPoint* then calculated the gain for each of the cognitive aspects that are used in research ranging from the knowledge level (C1), comprehension (C2), the application (C3) and analysis (C4). Then obtained the following data:

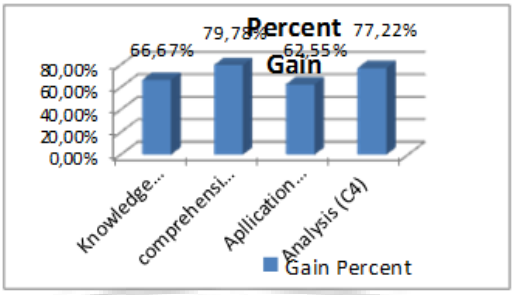

Figure 3. Percent Gain Cognitive Domains

This study aims to determine differences in learning outcomes of both classes (experimental and control). Before conducting the study, the first two classes are given early tests using 20 questions that are valid and reliable. Then, after being given a different treatment in the second grade, then do the final test. Based on the study gained an average pre-test the experimental class at 29.67 while the control class is 32. Based on data analysis of learning outcomes in the study after being given learning by applying the model of PBL obtained by the study of students at the post-test of 82.5 and the control class is 70. Based on the results of testing the hypothesis improving student learning outcomes obtained $t_{Calculate}$ price> t_{table} α ie 9.913> 1.6723 with a significance level (α = 0.05) so that Ha is accepted and it can be concluded that the result of learning using *Problem Based Learning* model using *PowerPoint* higher media compared with the results of learning without using *Problem Based Learning* by using *PowerPoint* media.

Moreover, with the use of PBL using PowerPoint media in the learning process can also improve cognitive students. In accordance with the results of the analysis of cognitive, an increase in the knowledge level of 66.67%, amounting to 79.78% comprehension, application amounted to 62.55%, and for the analysis of 77.22%. Based on the research that has been done, the model PBL learning outcomes chemistry is higher than with conventional learning models. This is because the model PBL is student-centered and they are charged with the responsibility of nature to solve a problem related to everyday life.

4. CONCLUSIONS

Based on the research that has been done, it can be concluded that: (1) Improving student learning outcomes with learning *Problem Based Learning* (PBL) is higher than the average increase in learning outcomes of students taught by conventional learning models; (2) The most growing cognitive aspects of the use of models with media PBL *PowerPoint* is an increase in the knowledge level of 66.67%, amounting to 79.78% comprehension, application amounted to 62.55%, and for the analysis of 77.22%; and (3) The research showed an increasing percentage of student learning outcomes are taught using a model *Problem Based Learning* with *PowerPoint* media by 81.86%, while learning without using the model of Problem Based Learning with PowerPoint media amounted to 60.15%.

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