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SE-032

THE EFFECT OF GUIDED DISCOVERY BASED LEARNING MODEL TOWARDS STUDENTS LEARNING OUTCOMES OF CHEMISTRY ON REDOX REACTION CONCEPT

Anna Juniar[1]*, Dede Suriyani[2], Pravil Mistryanto[3], and **Debby Masteriana[4]**

[1,2] Chemistry Department, Faculty of Math and Science Unimed
[3]Chemistry Department, Faculty of Math and Science USU
[4]Math Department, Faculty of Math and Science Unimed
**Email: anna.juniar@ymail.com*

ABSTRACT

This research was purposed to determine the effect of guided discovery – based learning model towards students learning outcomes of chemistry on redox reaction concept. The population which used in this research was students of X MIA SMAN 3 Medan. The samples was two classes with amount of 64 students were taken by purposive technique so that obtained students for experimental class who learned with guided discovery– based learning model and control class who learned with conventional model by scientific approach. The research instrument was test contained of multiple-choice questions with amount of 20 questions that have been declared valid and reliable. Chemistry learning outcomes of students in experimental class was 35.235 (pretest) and 79.705 (post-test) while in control class was 34.911 (pretest) and 69.970 (post-test). The enhancement percentage of experimental class was 78.46% while control class was 53.60%. Based on data analysis, obtained that $t_{statistics}$ was 4.446 while t_{table} was 1.6697 at the level of α=0.05 and dk=66, so that $t_{stat} > t_{table}$. This means Ha was received and concluded that learning outcomes of students which learned through implementation of guided discovery – based learning model was higher than learning outcomes of students which learned with the conventional model by scientific approach.

***Keywords**: Guided Discovery – Based Learning, Learning Outcomes, Redox Reaction*

INTRODUCTION

Definition of education according to Indonesian Dictionary is the process of changing attitudes and code of conduct of a person or group of people in a mature business man through teaching and training efforts. In a rather broad sense, education can be defined as a process with certain methods so that people acquire the knowledge, understanding, and how to behave in accordance with the requirements (Shah, 1995).

Educational issues was one problem of the learning process. In the current learning process of students directed to memorize information, students are forced to recall and hoard the information, so students only accommodate what teachers tell without knowing the usefulness of such information in everyday life. If this is applied to the science subjects then the students can not develop the ability to think critically and systematically, because the learning process is not used properly thought in any learning process in the classroom (Melani, 2012).

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Reigeluth (1983 in Simalango 2008), stating that the lack of teacher-developed learning process is one of the problems facing our education. The learning process developed by teachers are not in accordance with the guidelines specified standard educational process set out in Government Regulation (PP) No. 19 of 2005 Chapter 1 Article 1 Paragraph 6 that is: "Standard process is the national standard of education, education relating to the implementation of learning in the educational unit to achieve a standard of competence of graduates."

Based on observation in SMAN 3 Medan which is one of the state high school in the city of Medan, with a minimum value of completeness criteria (KKM) of 75 from the data recapitulation of first semester examination scores, there are still many students who do not satisfy the KKM, they are all students of class X MIA because of chemistry teachers still use the conventional learning model. The learning model is more centered on the teacher, where more one-way communication from the teacher to the student cause students glued to hear and really boring, which is why the participation of students in low-impact study chemistry at low student learning outcomes (Suhendry, 2012).

To solve the problems that occur in the learning process then it needs discovery learning model of learning, especially in the material which containing of redox reaction with high abstraction concept but has concrete examples.

Guided discovery learning based – learning model can be used as an alternative to improve the quality of learning chemistry and develop science process skills of students. Guided discovery learning is a learning model that aims to train students to define the concept independently. Students are actively involved in the learning process by answering various questions and solving problems to find a concept. In the guided discovery learning, teachers present these examples, and provide conclusions when students have been able to describe the ideas that have been taught by teachers (Mutoharoh, 2011).

Results of research conducted by Sulityowati (2012) of 'Effectiveness Guided Discovery Learning Model Toward Chemical Problem Solving Ability' results show that the learning model guided discovery learning can improve learning outcomes and the ability of solving chemical problems. Rosilawati and Sunyono (2008), 'Improving Activity and Understanding Concept of Thermochemistry Through Guided Discovery Learning (GUIDED INQUIRY) in SMA Perintis I Bandar Lampung' was 77.88%. Agustina (2012) on 'Improving Skills Mastery and Grouping Concept of Hydrocarbon With Guided Inquiry Learning Model' shows the average of gain value skills grouping for the control and experimental classes was 0,42 and 0.80. While the average value of n-Gain mastery of concepts for the control and experimental classes are 0.22 and 0.55. Suryani, N (2013) on 'Application of Guided Inquiry Learning Model in Analyzing Skills Inference

Material Grouping And Colloids' indicate where grouping students skills, high group 62.5% of students was very good; and 37.5% was good. There was 20.0% of groups very good; 60.0% was good; and 20.0% was good enough. Low group of 22.2% was good; and 77.7% was good enough. Inference skill of students in high group was 75% very good; and 25.0% was good. In middle group there was 26.6% very good; 40.0% was good; and 33.3% was good enough. In lower group there was 33.3% was good; and 66.6% good enough. Rohmawati (2012) on "Improving The Mastery Concept on Topic Hydrocarbons Through Guided Discovery Learning' resulted class which was guided by discovery learning has a higher mastery of the concept than conventional class. The average of the value of N- Gain for mastery concepts for students of experimental and control classes are 0.539 and 0.402 respectively.

Based on the above, the authors are interested to do research with the title "The Effect of Guided Discovery Based Learning Model Towards Students Learning Outcomes of Chemistry on Redox Reaction Concept."

METHODOLOGY

The method used in this study was the experimental method. Experimental class were treated with guided discovery-based learning models, while grade control treated with conventional models with a scientific approach. After the learning process was complete, the assessment of learning outcomes did. This study was a pretest-postest group design. The population in this study were students of class X SMAN 3 Medan Academic Year of 2013/2014. The sampling technique used was purposive sampling. Free variable of guided discovery-based learning was in the experimental class and control class with conventional learning models by a scientific approach. Bounded variables namely chemistry student learning outcomes on the subject edox reaction of X MIA in SMA 3 Terrain Academic Year 2013/2014. Control variables namely teachers, books, and used same insruments. While for measuring the activity of students using the observation sheet. Instruments that used should be validated by expert teams, and then tested for tested for validity, reliability, level of difficulty and distinguishing point. Testing the hypothesis in this study using the right side of t-test.

Data collection techniques using: test methods for student learning outcomes. Instruments used in the form of this research was syllabi, lesson plans, and student worksheet (LKS). Test for normality using the chi-squared test, the homogeneity test using varians data and hypothesis test using t-test on right side. All tests were performed by using Microsot Excel.

RESULTS AND DISCUSSION

The data on this research was student learning outcomes where the asssesment obtained from the pretest and posttest while affective and psychomotor assessment obtained

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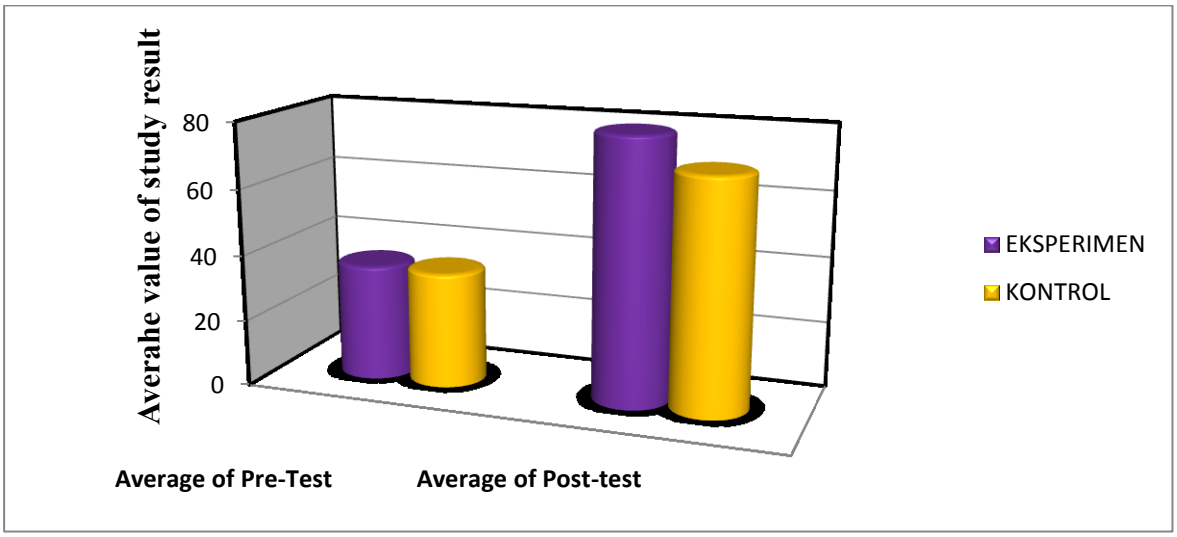
from the results of observations made by observant, which can be seen from the observation of how much activity the students in learning chemistry with Guided Discovery – Based Learning Model.

Student Results. From Table 1, it can be concluded that the experimental class with 79.705 post-test value greater than the control class with post-test score of 69.970.



Class	Mean	
	Pre-Test	PostTest
Experiment	35.235	79.705
Control	34.911	69.970

Figure 1. Average Student Results Class Value

Improved Learning Outcomes. The increasing results of learning outcomes can be directly searched from the average value of the gain all the students for each class can be seen in Table 2.

Table 2. Average Value of Increasing Learning Outcomes

Class	Criteria	Note :	Gain	Note:
Experiment	G < 0.3 = Low 0.3<G>0.7 = Medium	Σg = 23.275 $\Sigma \bar{g}$ = 0.7846	78.46%	High
Control	G > 0.7 = High	Σg = 18.237 $\Sigma \bar{g}$ = 0.536	53.40%	Medium

Test of Normality. Normality test of student outcomes data from experimental class obtained $X^2_{statistics}$ for pre-test 10.4 and $X^2_{statistics}$ for post-test 9.09. By taking the level of significance α = 0.05 and df= 5 was 11.07, from data shown Chi Square ($X^2_{statistics}$) < Chi Square (X^2_{table}) so, it can be concluded the data of chemistry learning outcomes of students was normally distributed. While the normality test of data of student learning outcomes value obtained of control class with $X^2_{statistics}$ for pre-test 5.85 and 5.49 for the post-test. By taking the

level of significance α = 0.05 and df = 5 was 11.07, the data shown Chi Square ($X^2_{statistics}$) < Chi Square (X^2_{table}), so it can be concluded data of chemistry learning outcomes of students was normally distributed.

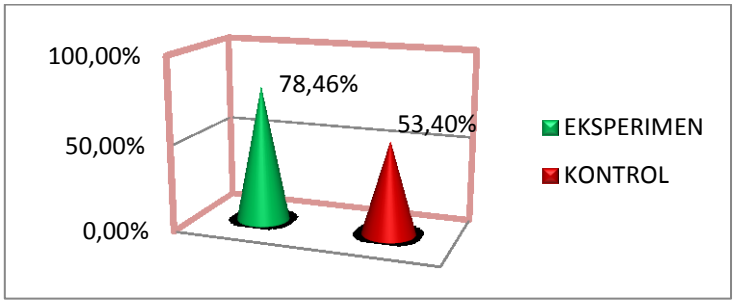


Figure 2. Average Value of Gain Sample

Test of Homogeneity. The results of calculations for homogeneity test of pre-test and post-test data both of experimental and control classes by comparing $F_{statistics}$ and F_{table} said homogeneous if the value of $F_{statistics} < F_{table}$ at significance level α = 0.05, the pre-test value of $F_{statistics}$ was 1.18 while the post-test value of $F_{statistics}$ was 1.033. Based on the table of values for the F distribution with significance level α = 0.05 and dk numerator = 33 and dk denominator =33 (F_o (33.33) obtained value of F_{table} = 1.776 (with interpolation). Because the value of $F_{statistics} < Ft_{able}$, then concluded that the pre-test and post-test of these two classes was homogeneous.

Observation. Based on observations, student learning activities throughout the experimental class and the control class was increased in learning activities of each meeting, from the first to the third meeting. Student learning activities of experimental class was higher than control class, because the control class students are not involved in finding the concept, as part of the learning stages required in the curriculum in 2013.

Table 3. Mean Value of Affective And Physcomotoric

Class	Affective Value	Explanation	Pyscomotoric Value	Explanation
Experiment	76.716 %	Good	76.205 %	Good
Control	73.696 %	Enough	70.911 %	Enough

Hypothesis Testing. From the distribution data of t got t_{table} = 1.6697 while based on calculation, $t_{statistics}$ = 4.446 so the value of $t_{statistics} > t_{table}$ (4.446 > 1.6697). Thus the criteria of hypothesis testing $t_{statistics} > t_{table}$ sattisfied. This means that H_0 is rejected, H_a accepted that is chemistry learning outcomes of students who apply learning model of Guided Discovery Based – Learning is higher than the conventional learning model with the scientific approach to the subject of redox reactions in class X SMA 3 Medan.

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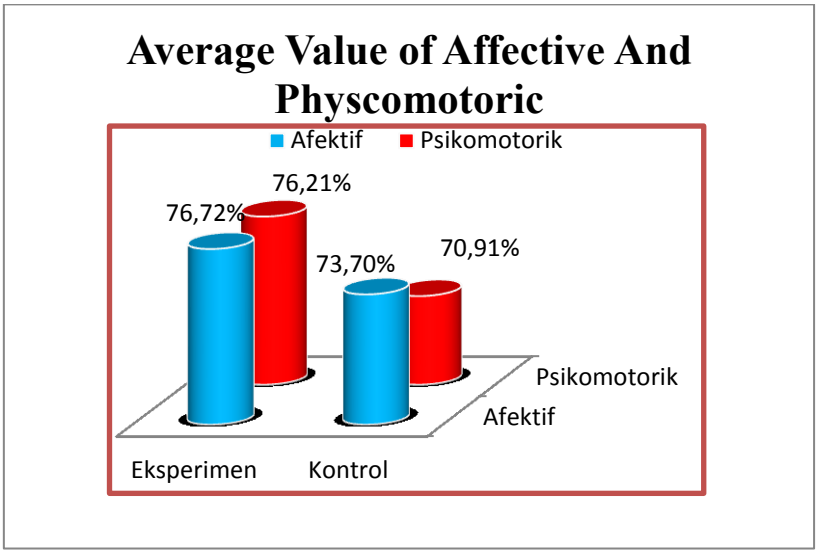

Figure 3. Average Value of Affective And Physcomotoric

CONCLUSION

After did research, data calculation and hypothesis testing, the researchers came to the conclusion, the results of studying chemistry of students who taught by applying the learning model of Guided Discovery Based – Learning has effect on student learning outcomes. In the experimental class provides better results with the pretest of 35.235 and post-test of 79.705 rather than student learning outcomes in the control class that was taught by conventional teaching with scientific approach pretest score of 34.911 and post-test value of 69.970. Increasing percentage of learning outcomes in Experimental Class was 78.46% and Control Class was 53.60%.

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