

The Application of Cooperative Learning Round Robin to Improves Student Learning Achievement on the Subject of Electrolyte-Nonelectrolyte and Redox in Class X SMAN 1 Seberida

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Abstract - Research on the application of cooperative learning model Round Robin has been conducted to improve student learning achievement on the topic electrolyte- nonelectrolyte and redox at class X SMAN 1 Seberida. This research is experimental research with randomized control group pretest-posttest design. The sample took in the 10 Maret – 24 April 2013. The sample consisted of two classes, X₃ class as experimental class and X₁ class as control class. Experimental class is a class that is used cooperative learning model Round Robin, while the control class was not. Data analysis technique used is the t-test. Based on analysis of data obtained $t_{\text{arithmetic}} > t_{\text{table}}$ is $3.43 > 1.67$, means that the cooperative learning model Round Robin can improve student achievement on the subject of reaction rate in class X SMAN 1 Seberida where the effect of an increase is 15.96

Keywords: cooperative learning, round robin, learning achievement, electrolyte- nonelectrolyte and redox

I. INTRODUCTION

Learning is a process by which a person undertakes a whole new behavioral change as a result of his own experience in interaction with his environment [6]. The presence of teachers in the teaching and learning process still plays an important role [8]. As an educator who is directly involved in the implementation of learning, teachers should be able to choose and apply the right way of learning. If the teacher succeeds in creating an atmosphere that causes students to be actively motivated in learning, it will allow for

increased learning outcomes. For learning in schools, students are exposed to a number of subjects, one of them chemistry subjects.

Chemistry is part of the Natural Science (IPA) that is taught at the secondary school to college level. Chemistry is the study of the structure, structure, properties, and changes in matter and energy that accompany material changes. In chemistry subjects, students study various topics such as Electrolyte-Nonelectrolyte and Redox Reaction. This subject is the subject of memorization, understanding and calculation so that the necessary way for students to learn actively and easily understand the material provided by the teacher.

Information obtained from chemistry teacher class X SMAN 1 Seberida, there are still many students who have difficulty learning on the subject Electrolyte- nonelectrolyte and Redox Reaction. This can be seen from the average value of students on the subject Electrolyte- nonelectrolyte and Redox Reactions 2012/2013 academic year that has not met the Minimum Exhaustiveness Criteria (KKM). Teachers informed that on the learning of chemistry in class X SMAN 1 Seberida academic year 2012/2013, teachers have attempted some learning method, but in the learning process not all students are actively involved. If students are given practice questions and asked to go forward to complete it, students who often forward only certain students while the other students just want to wait for answers from friends. The interaction between teachers and students is dominated by

these students, so not all students can be active in the learning process [3].

Efforts that can be done to improve student motivation and activeness One of them is by applying the appropriate learning model. Learning model is a planning or a pattern used as a guide in implementing the learning process [9]. The use of a new learning model can also provide a new atmosphere during the learning process so that students become more motivated.

A teacher should seek active students in the learning process, In order for student learning outcomes are satisfactory. Teachers are expected to be able to choose how to teach so that students can activate. Learning model is expected to improve student activeness one of them is cooperative learning model Round Robin type.

Cooperative learning is a learning where students study in small groups collaboratively consist of 4-6 people with heterogeneous group structure. One of the stages in cooperative learning is the appreciation given to the group based on the contribution of the individual student evaluation value so that each student will have a sense of responsibility towards the group[5]. While round robin is a model of cooperative learning that teaches students how to wait their turn while working in groups. Learning activities designed in the round robin learning model enable students to be more active, creative, responsible, cooperative, healthy competition and learning engagement [1].The round robin steps according to [1] are as follows:

- 1).The teacher presents the material to be taught in a broad outline;
- 2). Students are grouped in groups of 4-6 students;
- 3). Students sit around in a circle;
- 4). The teacher asks a question in the form of a double-answer piece or a topic that can be used in brainstorming
- 5). The teacher sets the timer (Timer, stopwatch) according to the agreed time, for example 10 seconds for each student and 2 minutes for the whole team (depending on the likelihood of short length of answer, as well as the difficulty level of the teacher)
- 6). Students sitting around the table write answers in turns according to the time provided;
- 7). The student continues the brainstorming until the time devoted to the question is exhausted;
- 8) The teacher together with the student summed up the overall learning material that had been studied.

II. METHODS

The study was conducted at SMAN 1 Seberida in X class of semester of the academic year 2012/2013 on March 10 - April 24, 2013. The population in the study were the students of class X SMAN 1 Seberid semester of the academic year 2012/2013 consisting of 4 classes taught by one chemistry subject teacher. Samples were taken two homogeneous classes, then determined by experiment class and control class

by drawing, then got class X₃ as experiment class and class X₁ as control class.

The study used the Randomized control group pretest-posttest design. The study design according to [4], can be seen in table 1.

Table 1. Research design

Class	Pretest	Treatment	Posttest
Experiment	T ₀	X	T ₁
Control	T ₀	-	T ₁

Information:

X :Treatment of the experimental class

T₀:The pretest grade of the experiment class and the control class.

T₁: The value of the experimental class posttest and the control class

Technique of collecting data in research is test technique. The data collected were obtained from: (1) Pretest, performed in both classes before learning the subjects of electrolytes-nonelectrolyte and redox reactions, (2) Posttest, given in both classes after study of redox reactions. While the data analysis technique used in the study is t-test. T-test statistics can be performed based on the criteria of normally distributed data. Therefore, before the data processing, firstly tested the normality using Liliefors test. If L_{max} price < L_{table}, then the data is normally distributed. Llabel Price obtained by formulation[6]:

$$L =$$

After the data is normally distributed, then the homogeneity test is done by testing the variance of both samples (homogeneous or not) first, by the formula:

$$F = \frac{\text{Varian terbesar}}{\text{Varian terkecil}}$$

The pretest of each sample class is used for hypothesis testing. Hypothesis in this research is the application of cooperative learning model type Quick On The Draw can improve student achievement on redoks subject in class X SMAN 1 Seberida. Then t-test is done to test the hypothesis, with the following formula [7]:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_g \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \quad \text{dengan} \quad S_g^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}$$

By the criteria of hypothesis testing the research is accepted if t_{count}>t_{table} where t_{table}obtained from the list of distribution t with dk = n₁ + n₂ - 2 with the real level α = 0.05. the effect of student achievement improvement is shown by the following formula:

$$Kp = r^2 \times 100 \%$$

III. RESULTS AND DISCUSSION

A. Results of Data Processing Analysis

The results of data analysis research will be described is the result of normality test data analysis, the results of homogeneity test data analysis, the results of hypothesis test data analysis and the results of improved analysis of learning achievement

1. Pretest Data

The result of normality test of pretest data can be seen in table 2

table2. Pretest Normality Test Results

Group	N	\bar{x}	S _D	L _{count}	L _{table}
Experiment	32	31,88	11,15	0,14	0,156
Control	32	32,75	11,10	0,09	0,156

With n = amount of data in group, \bar{x} = average value of group, SD = standard deviation and L = statistical symbol to test normalization

Can be seen in Table 2 that the experimental group obtained $L_{\max} < L_{\text{tabel}}$ is 0.14 < 0.16 and L_{\max} control group $< L_{\text{tabel}}$ is 0,09 < 0,156. This shows that both groups are normally distributed

2. Posttest data

The result of normality test of posttest data can be seen in Table 3

table 3. Posttest Normality Test Results

Group	N	\bar{x}	S _D	L _{count}	L _{table}
Experiment	32	83,13	7,09	0,11	0,156
Control	32	76,25	8,44	0,09	0,156

Can be seen in Table 4.3 that in the experimental group obtained $L_{\max} < L_{\text{tabel}}$ is 0.11 < 0.156 and L_{\max} control group $< L_{\text{table}}$ is 0,09 < 0,156. This shows that both groups are normally distributed.

3. Homogeneity Test

The results of homogeneity test analysis can be seen in table

table4. Homogeneity Test Results

Group	N	$\sum X$	$\sum X^2$	\bar{x}	F _{table}	F _{count}	t _{table}	T _{count}
Sample 1	32	2425	186275	75,78	1,82	1,10	2,00	0,54
Sample 2	32	2385	180525	74,53				

Description: n = number of students receiving treatment

$\sum X$ = number of posttest and pretest difference values

\bar{x} = average value of posttest and pretest difference

Sg = standard deviation combined

The t_{count} value lies between $-t_{\text{tabel}}$ and t_{tabel} ($-2.00 < 0.54 < 2.00$) thus, it can be concluded that both samples have the same basic capability (homogeneous). The two homogeneous classes were then randomly selected as experimental and control groups, namely class X₃ as the experimental group and class X₁ as the control group.

The result data of hypothesis test analysis can be seen in table 5.

table 5. Hypothesis test results

Group	N	$\sum X$	$\sum X^2$	\bar{x}	S _{gab}	t _{table}	T _{count}
Experimen	32	1640	86112	51,25	9,04	1,67	3,43
Control	32	1392	62272	43,5			

Description: n = number of students receiving treatment

$\sum X$ = number of posttest and pretest difference values

\bar{x} = average value of posttest and pretest difference

Sg = standard deviation combined

The results of the hypothesis test data analysis show that $t_{\text{count}} > t_{\text{table}}$ ($3.43 > 1.67$). This suggests that "the application of the Round Robin type of cooperative learning model can improve student achievement on the subject of Electrolyte-Nonelectrolyte and Redox Reagents in Grade X SMAN 1 Seberida".

Improvement of student achievement of experimental class with Round Robin cooperative learning model occurs because Round Robin cooperative learning model requires students to be actively involved in learning process, can reduce student dominance in answer group questions, encourage students to study harder and more master the subject matter, because each student is given individual responsibility in working on the questions given

Giving different questions to each learner in the group, will spur interest to find out the problems done by friends next to him. For example, at the third meeting students learn about oxidation-reducing reactions, learners B gets about the determination of oxidizing and reducing agents in redox reactions, learners C gets about the determination of the oxidation and the reduction results in the reaction redox and learners D get questions about determination of disproportionation and konproporsionasi reactions. The difference of questions given will arise the interest of each learner A, B, C and D to find out what is done by the friend next to them. The time given to work on a problem is approximately 5 minutes (depending on the length of the answer). If the 5 minute time has been exhausted, the question that has been answered will be rotated clockwise so that each learner will receive a new problem. In the example above, after the rotation of the questions A learners will receive the questions from learners D, learners B receives questions from learners A and so on until all the questions are finished rotating. If a learner spends time to answer the question in less than 5 minutes, then he will still wait until the 5 minute time runs out because the matter will rotate every 5

minutes. Rotation or rotation of questions will make learners try their best to prepare for new problems, because the new problem will be different from the previous problem.

The existence of rotation problems in the model of cooperative learning type Round Robin will make all learners involved actively in the learning process. Involvement of all learners in solving the problems given will provide equal opportunities for all learners to be able to issue their ideas / opinions so as to avoid the dominance of smart students in the learning process. The existence of time constraints in the work of each question will make the learner to be more serious in doing the problem because next every problem will be done so that no chance of the students to play games in solving the given problem.

The results showed that the experiment class students were more active than the control class students. This can be seen from the activities of learners during the learning process on the assessment sheet attitude and skills of learners and skills of learners in the practicum. Activity learners can be seen from the involvement of all learners in the learning process because with the rotation of the problem in the model of cooperative learning type Round Robin every learner involved to contribute his opinion. Then learners who ask and answer questions in the experiment class more than the control class because cooperative learning type Round Robin requires learners to do the repetition in thinking so that learners can answer the questions posed.

Round Robin learning model, Every problem done individually by each learner will help learners to be able to build their own knowledge because the answers come from each individual learners so that will spur his thinking power. [6] that when learners become active participants in the learning process, then he will have the knowledge obtained well. Knowledge sought and built by these learners will last longer in the commemoration of learners, in this way can be known to what extent learners understand the lesson given.

Although the Round Robin learning model contributes in improving the achievement of learners, but in the implementation there are some obstacles encountered, one of them Limited time in the implementation of research because at the time of answering the problem individually, there are still learners who request additional time so that the rotation is not smoothly because they have to wait for learners who spend more time than specified. This is overcome by giving emphasis and affirmation to the learners that the time provided to answer the problem is limited so it is expected that all learners can take advantage of the time given as possible. Another constraint is also in one group feel unsuitable because the division of the group is determined by the teacher, so when the group of students become noisy, to overcome the teacher explained that each group is formed heterogeneously so that students can learn to adapt to the group and also explained that will be awarded the group, where each member of the group is responsible and should be mutually cooperative in their respective group.

IV. CONCLUSION

The application of cooperative learning model of Round Robin type can improve student's learning achievement on the subject of Electrolyte-Nonelectrolyte and Redox Reaction in class X SMA Negeri 1 Seberida with $t_{count} > t_{table}$ is $3.43 > 1.67$. The influence of students' learning achievement in the experimental group is 15.96%.

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