

Improvement of Student Learning Outcome Using Model of Collaborative Based Lesson Study With Student's Worksheet on Materials Hydrolysis

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Abstract — This study aims to determine whether the improvement of learning outcomes of students who are taught using Collaborative Learning Model Based on Lesson Study with Student's Worksheet is higher than the improvement of student learning outcomes that are taught using Direct Instruction model with Student's Worksheet on salt hydrolysis material. This type of research is an experimental study using Pretest-posttest Control Group Design. The research sample is class XI IPA 5 and XI IPA 7 MAN 1 MEDAN year 2015/2016 lesson taken by random sampling. The instrument used to determine student learning outcomes is objective test in the form of multiple choice amounted to 20 questions. Research data taken in the form of pre-test and post-test. Data analysis in this study used normality test with Shapiro-WiStudent's Worksheet test on SPSS, homogeneity test with Levene Test test on SPSS, and hypothesis test with Independent-Sample T Test on SPSS. From the average of gain, obtained percentage of increase of learning result of experiment class student equal to 78% while percent improvement of result of student learning control class equal to 63%. The result of this research is the improvement of chemistry learning result of students applying collaborative learning model based on lesson study with Student's Worksheet higher than Direct Instruction learning model with Student's Worksheet on salt hydrolysis material, it is proved by calculation on t test that is obtained by Sig. Thitung $< \alpha$ (0,000 < 0.05).

Keywords : collaborative based lesson study, student's worksheet, hydrolysis

I. INTRODUCTION

Education is a planned effort to create an atmosphere of learning and learning process so that learners are actively developing their potential to have the necessary skills themselves and the community. The learning process that develops in the classroom is generally determined by the role of teachers and students as individuals directly involved in the process. Student learning achievement itself depends a lot on

how the teacher conveys the lesson to the students. Therefore, the ability and readiness of teachers in teaching plays an important role for the success of teaching and learning process. This indicates a link between student learning achievement and the teaching method used by the teacher [1].

The difficulty of learning chemistry lies in the gap that occurs between understanding the concept and applying the existing concepts that lead to difficult assumptions to study and develop them [2]. In presenting the chemistry to be more interesting, the teacher must have the ability to develop the teaching method in such a way that the expected learning objectives on the competency standard can be achieved well [3].

Based on preliminary observation in MAN 1 MEDAN found that in chemistry learning, chemistry teacher still conveyed the learning as in general that is method of lecture (Direct Intruction). Most students do not get excited when learning chemistry and students assume that chemistry is a difficult and tedious learning. In the curriculum of KTSP for MAN, the subject of chemistry is one of the compulsory subjects for the class XI MAN Science Program (IPA). One of the chemicals found in class XI MAN is the material of salt hydrolysis. In this material contains many concepts, calculations and applications on life.

Seeing the problem above, it is necessary to make improvements, changes and renewals where the students should not be regarded as the object of learning alone, but must be given an active role and become partners in the learning process so that students act as active learner agents while teachers act as facilitators and creative mediators . Efforts that can be done is to improve the quality of teachers in conveying learning, applying appropriate learning models and appropriate media usage in supporting the achievement of learning objectives.

A teacher's skill in delivering material that can inspire students' motivation to learn is an achievement that shows the teacher's professional level. Lesson study is one form that can

be done to improve the professionalism of teachers [4]. Lesson Study is not a strategy or method in learning, but is one of the coaching efforts to improve the learning process conducted by a group of teachers in a collaborative and sustainable, in planning, implementing, observing and reporting the results of learning activities. Lesson Study is an activity that can encourage the formation of a learning community that consistently and systematically perform self-improvement both on individual and managerial level [5]. Lesson study is carried out in three stages: Plan, do (do), and see (reflect) ongoing. In other words, lesson study is a never-ending way of educational quality [6].

One example of a learning model that can be applied in an effort to improve student learning outcomes is a collaborative learning model (Collaborative Learning). Collaborative learning model is one of the learning models that can develop students' active participation. Collaborative learning model consists of 6 steps: Delivery goals and motivate students; Presentation of information in the form of demonstrations or through reading material; Organizing students into study groups; Guiding group work and study; Assessment of what has been learned so that each group presents its work; and reward both groups and individuals. Collaborative learning is designed to carry out complete learning. Learning will not work if each student does not understand the purpose or competence of learning. In achieving the goals of the student consultation or sharing with the teacher [7].

Collaborative learning model has been studied by several previous researchers, among others: Arif Dermawan (2014), the results of his research states that there is an increase in student learning completeness in the experimental class that applies collaborative learning based on quiz edutainment more than the control class. Based on the mean value of students' cognitive learning outcomes in the experimental class, students' completeness reaches 93.5%. While the completeness of students in the control class reached 91.17%. So it can be said that the learning model of collaborative learning based on effective edutainment quiz is applied with very good criteria [8]. And other researchers namely Eviyanto, et al stated that there are differences in learning outcomes between classes that are taught using a collaborative learning model. The difference can be seen from the result of t test and the average value of each class is the experimental class of 83.33% and the control class is 76.17% [9].

Media is an integral part of the teaching and learning process in order to achieve the goals of education in general and the objectives of learning in school in particular [10]. Learning media is a tool for teaching and learning process. Everything that can be used to stimulate thoughts, feelings, attention and ability or learning skills so as to encourage the learning process. Without mentioning the type of each medium, Gagne makes 7 kinds of media groupings, ie objects to be demonstrated, oral communication, print media, still images, motion pictures, voiced films, and learning machines [11]. Student worksheet is one type of print media that is considered suitable for students to learn directed and contains tasks done by students in the form of problems in groups.

According to research Dhewani, et al (2015) states that the application of STAD learning model equipped with Student's Worksheet can improve learning motivation and student achievement [12]. Lestari, et al (2014), the results of his research stated that the implementation of cooperative learning model type NHT accompanied by Student's Worksheet can improve student achievement and creativity on solubility and solubility result of students of grade XI IPA 4 SMA N 2 Karang anyar lesson year 2012/2013 [13].

Based on the description, the researcher is interested in doing research to know about "The Influence of Collaborative Learning Model Based on Lesson Study with Student's Worksheet on Improving Student Learning Result on Salt Hydrolysis Material"

This study aims to determine the improvement of learning outcomes of students who are taught using Collaborative Learning Model Based Lesson Study with Student's Worksheet is higher than the improvement of student learning outcomes that are taught using Direct Instruction model with Student's Worksheet on salt hydrolysis material "

The expected benefits of the results of this study can generally be described as follows: a) For students, can provide student motivation, train students skills, develop a critical attitude and can increase students' interest and chemistry learning results, b) For teachers, can be used as input as well as consideration in choosing an effective and innovative learning model in the learning process, c) For other researchers, ie as input or consideration in the development of similar research in the world of education, d) For readers, provide information about the Influence of Collaborative Learning-Based Model Lesson Study with Student's Worksheet to Improve Student Learning Result on Salt Hydrolysis Material.

II. RESEARCH METHODS

This type of research is an experimental study. This study involved two different treatments between the experimental class and the control class with the design: Pretest-posttest Control Group Design. The research design can be seen in table 1.

Table 1. Research design

Group	Pre-test	Treatment	Post-test
Experiment class	T ₁	X ₁	T ₂
Control class	T ₁	X ₂	T ₂

Information :

- X1 = Treatment in the experimental class, the lesson study based collaborative learning model with the student worksheet
- X2 = Treatment in control class, that is direct instruction instruction model with student work sheet
- T1 = Initial test (Pre-test) given to the experimental class and control class
- T2 = The end test (Post-test) given to the experimental class and control class

The sample of this research is class XI IPA 5 and XI IPA 7 MAN 1 MEDAN year 2015/2016 lesson taken by random sampling. Data collection was done by test method and questionnaire method. Test methods are used to obtain student learning outcomes. While the questionnaire method used for the implementation or achievement of lesson study indicators. Data analysis in this study used normality test with Shapiro-WiStudent's Worksheet test on SPSS, homogeneity test with Levene Test test on SPSS, and hypothesis test by Independent-Sample T Test on SPSS.

III. RESULTS AND DISCUSSION

After going through the results of calculation of validity, realitas, the level of difficulty and different power obtained 20 questions that are appropriate to be used as a test instrument in research.

From the research, there is an increase of learning outcomes from lesson study based collaborative learning model. This can be seen from the average pretest grade of the experimental class of 41.56 and the average value of the pretest control class of 41.50. Based on the average pretest value, each class indicates that both data are normally distributed and have a homogeneous variant. This means the sample has the same basic (initial) capabilities. Then both classes are experimental class and control class is done treatment, then done posttest to know the learning result. The average post-test value in the experimental class is 86.72 while the average post-test in the control class is 77.63. Learning result data is in table 2.

Table 2. Average Student Learning Results

Group	Pre-test	Post-test
Experiment class	41.56	86.72
Control class	41.50	77.63

The difference in student learning outcomes between the two classes can be known through the gain data. Where from the average gain, obtained percent increase in learning outcomes of experimental class students by 78% while the percent increase in student learning outcomes control class by 63%. data on improving learning outcomes are shown in table 3.

Table 3. Percentage increase in learning outcomes

Group	improving learning outcomes (%)
Experiment class	78
Control class	63

Differences in student learning outcomes taught with lesson study-based collaborative learning model with student's worksheet and direct instruction learning model with student's worksheet of 15%.

This shows that the application of collaborative learning model based on lesson study with student's worksheet media can improve student learning outcomes.

In practice, the use of collaborative learning model is a model of group learning that is designed to perform complete learning ie learning will not work if each student does not understand the purpose or competence of learning. In teaching and learning activities in this learning model,

students learn in groups, discuss, work together, responsible for the tasks that have been agreed, and presenting discussion results on the tasks that have been agreed. In the learning process it turns out to develop the active participation of students. From active classroom conditions and students who are enthusiastic in following learning with this collaborative learning model, it can be seen the difference from previous learning where the students just sit listening to the explanation from the teacher, where the teacher fully give knowledge to the students (teacher center). Thus, it can be seen that with the application of collaborative learning models, students are more interested and enthusiastic when learning because students are involved in the learning process.

In this research, collaborative learning model based on Lesson study with student's worksheet. In the implementation of lesson study based on lesson study, the lesson study team made lesson planning by preparing the design of learning programs, then the model teacher is the researcher doing the class study in accordance with the RPP that has been made, and the other as the observer to observe the achievement of Lesson Study indicator that is being done. Then after the lesson is finished, the lesson study team reflects on the improvement of learning for the next meeting. The emphasis of the lesson study is more on the teacher with the aim of improving the quality of learning and learning which involves the whole process of communication within the classroom.

From the results of reflection made it is obtained that there is an increase in the achievement of indicators from one meeting to the second meeting except on the first indicator achievement does not increase or decrease. The second indicator shows an increase of 25%, the indicator does not rise by 25%, the fourth indicator increases 50%, the fifth indicator increases 25%, the sixth indicator increases 50%, the seventh indicator increases 25%, and the eighth indicator is an increase of 25%. Achievement of lesson study indicator can be shown through table 4.

Table 4. Achievement of Lesson Study Indicators

No	Indicator	Ideal score	Meeting 1		Meeting 2	
			Score	%	score	%
1	Students form the floor plan U	4	4	100	4	100
2	Students work together	4	3	75	4	100
3	Students who do not understand / ask to be taught	4	3	75	4	100
4	Students who care and teach other students	4	2	50	4	100
5	Students deepen their own thoughts	4	2	50	3	75
6	Students who listen more than speak	4	2	50	4	100
7	Students maintain motivation by learning together	4	2	50	4	100
8	Students take advantage of the media	4	3	75	4	100
Total		32	22	550	31	775
average		4	2,75	68,7	3,75	96,8
				5		75

From the data of achievement of lesson study indicator is seen that in the first indicator there is a decrease, this is due to the less extensive class conditions with a considerable number of students. At the first meeting the U-later seated position is formed in two layers and when each group discusses the assigned task, the students are less comfortable in the discussion. Thus, at the second meeting, U's later seated position only runs until the model teacher explains the learning material, but when in discussion time the U-later seated position is not executed again. Achievement of indicators that have increased greatly on the third indicator of students who do not understand ask to be taught, the fourth is the students who care and teach the other students and the sixth is the students who listen more than talking. Overall achievement of lesson study indicator increased from the first meeting 70.31% to the second meeting 95.31%. The successful implementation of this lesson study can be seen from the learning process, with the application of the U-seat sitting plan. The teacher can see the students as a whole and the teacher becomes more free to provide learning materials and the students who sit at the back no longer feel alienated or unnoticed. In addition, many aspects are evolving as well as working together, caring for others, helping each other, respecting others and having shared learning motivation that is very much in line with the goals of the collaborative learning model. Then with this lesson study, teachers can also improve their performance by learning more about how students learn and how teachers teach so that when there is a mistake or non-conformity of the lesson plan that has been made at the first meeting, the teacher can correct the mistake with the reflection of the observers so that the learning process can run better in future meetings than in previous meetings.

Before the first hypothesis test conducted prerequisite data test is the normality test and homogeneity test. The result of normality data test with SPSS using Shapiro-Wilks on the level of real $\alpha = 0,05$ with sign criterion. $> \alpha$, can be seen in table 5.

Table 5. Normality Test Results

Class	Data source	Sign	α	information
Experiment	Pre-test	0.074	0.05	normal distribution
	Post-test	0.057	0.05	normal distribution
	Gain	0.623	0.05	normal distribution
Control	Pre-test	0.054	0.05	normal distribution
	Post-test	0.156	0.05	normal distribution
	Gain	0.573	0.05	normal distribution

From table 5 above it can be concluded that pretest, posttest, and gain data of both groups of samples have normal data. While the result of homogeneity test by using spss that is by Levene Test test on the real level $\alpha = 0,05$ with Sign criteria. $Mean > \alpha$, can be seen in table 6.

Table 6. Homogeneity Test Results

Class	Data source	Sign	α	Information
Experiment	Pre-test	0.867	0.05	Data Homogen
Control				
Experiment	Post-test	0.139	0.05	Data Homogen
Control				
Experiment	Gain	0.282	0.05	Data Homogen
Control				

From table 6 , it can be concluded that the pretest, posttest, and gain data between the sample groups are homogeneous. Thus the normality and homogeneity test requirements have been met so that it can be followed by hypothesis testing. Hypothesis testing was done with spss using Independent Sample T-Test from data gain with significant level $\alpha = 0,05$ with Sig criteria. $Thitung < \alpha (0,05)$ hence H_a accepted and H_0 is rejected, and obtained Sig value. $Thitung = 0,000$, then $Sig. Thitung < \alpha (0,000 < 0,05)$ then H_a accepted. Thus, it can be concluded that the improvement of students' chemical learning outcomes that apply lesson study-based collaborative learning model with Student's Worksheet is higher than Direct Instruction learning model with Student's Worksheet on salt hydrolysis material.

IV. CONCLUSION

From the research result, it can be concluded that the improvement of student learning outcomes through the application of collaborative learning model based on lesson study using Student's Worksheet is higher that is 78% than the improvement of student learning outcomes that learn with direct instruction learning model with Student's Worksheet of 63%.

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