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Effect of Implementation of Lesson Study in Learning Chemistry Students Against Cognitive Competence at Salt Hydrolysis Material

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Abstract - This study aims to determine whether there is any influence on the implementation of *lesson study* on cognitive competencies of students in salt hydrolysis material. This research was conducted in January-March at Padang State High School 5. The type of research used is quantitative research. Sampling using *purposive sampling technique.* The research subjects were 34 students. The *lesson study* implementation was conducted three times with thestages *plan, do and see.* The research data was taken using interview instruments, and cognitive competency tests. The results of the t-test were 0.21, indicating that students' cognitive competencies were significantly better after learning was done with *lesson study.* Thus it can be concluded that the implementation of *lesson study* in chemical learning can improve the cognitive competence of students.

Keywords – *Lesson Study,* Cognitive Competence, Salt Hydrolysis

I. INTRODUCTION

Chemistry is the study of structure, properties, composition, material changes, and accompanying energy (Parning, 2000). Chemistry is closely related to everyday life such as incidents of burning garbage, making soap, and so on. One of the chemical materials studied in high school is hydrolysis of salt. The characteristics of salt hydrolysis material emphasize concepts and calculations. For salt hydrolysis material for example; determining the type of salt hydrolyzed in water and determining the pH of the salt solution. Based on the results of interviews with the chemistry teacher at Padang Public High School 5, information was obtained that students had difficulty with salt hydrolysis material which was characterized by the average acquisition of cognitive competencies of students for salt hydrolysis material of 59.10. The cognitive competence of the students obtained is still below the KKM standard (Minimum Completion Criteria), which is 78.

Basically, the quality of learning is closely related to the learning process. if the learning process goes well, it is expected that the quality of learning will also be good. Learning is a system that aims to help the learning process of students which contains a series of events or events that are designed, arranged in such a way as to influence and support the occurrence of internal learning processes (Gagne and Briggs, in Sanjaya, 2008). The learning process itself can be understood as a stage of change in individual behavior that is relatively settled as a result of experience and interaction with the environment which involves cognitive processes (Shah, 2008). Learning assessment is very necessary to improve the quality of learning. The teacher can find out the problems faced during the learning process through learning studies so that he can *review* his performance which can then be used as input to improve his performance and also can improve the quality of learning. One way to study the learning process is through *lesson study.*

II. LITERATURE REVIEW

Lesson Study is the process of developing teacher professional competencies that are systematically developed in the education system in Japan with the main goal of making the learning process better and more effective.

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Theprocess *lesson study* involves teachers in small discussion groups with activities including discussions in planning the teaching and learning process, teaching and conducting discussions after learning to improve the next process (Hendayana, 2006).

According to Hidayat (2015)steps *lesson study* are:

a. Planning (*plan*)

The initial stage of *lesson study* is the planning stage or *plan* which aims to design learning that can teach students, how so that students can actively participate in the learning process. The planning stage(plan) includes four steps: (1) analyzing the topic, (2) analyzing the reality of students, (3) making a learning plan, and (4) examining the learning plan.

b. Implementation (*Do*)

The second stage in *lesson study* is the implementation of learning to apply the learning design that has been formulated in the planning stage. Previously in planning, it was agreed on who the model teacher would implement learning and the host school. This stage aims to test the effectiveness of the learning model that has been designed. Teachers from the school concerned or from other schools act as observers / observers of learning.

c. Reflection(See)

Activity reflection carried out after learning activity*(do)*is completed, to see things that are found in the implementation of learning, both by the teacher and the observer models. Teachers and observers share for the findings related to student learning activities during the learning process. Observer and teacher learning models from the observed learning andresults are *sharing* used to revise the learning plan.

III. METHODOLOGY

This study used quantitative research conducted in February 2019 at Padang Public High School 5. The *lesson study* implementation is carried out 3 times . Research Subjects were 34 students of class XI MIPA 1, amounting to salt hydrolysis material. The class XI MIPA 1 was chosen because in the class there were still many student learning outcomes under the KKM of 78. The instruments used in this study consisted of interviews, observations and cognitive competency test questions.

IV. RESULTS AND DISCUSSION

a. Results

cognitive achievement of students is based on the value of quizzes and daily tests. In the salt hydrolysis material the quiz was conducted twice, namely at the first meeting and the third meeting. Cognitive learning results obtained from salt hydrolysis material with Minimum Completion Criteria (KKM) 78 can be seen in the table:

Table 1. Minimum completeness criteria for salt hydrolysis material

Value Category	Quiz I		Quiz I		UH	
	Frequency	%	Frequency	%	Frequency	%
N> 78	12	35 , 29	14	41.18	20	58.82
N ≤ 78	22	64.71	20	58.82	14	41.18
Total	34	100	34	100	34	100
Average Classes	71		73		75	

To find out the effect of implementing *lesson study* in chemistry learning on competence Cognitive students test hypotheses. Before the hypothesis test, normality tests were conducted on the sample class from the average value obtained during the meeting. After a normality test is obtained, the sample class is normally distributed, where the significant value is> 0.05. The t-test was then carried out to see the effect of implementing *lesson study* in chemistry learning on students' cognitive competencies. The following data on the results of testing the hypothesis for cognitive competencies of students can be seen in the table.

Table 2. Hypothesis Test Results for the SampleClass

	Value Test= 34					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Competence Cognitive	39.92 43.90	33	.021	4,912		42,863

If the significance value> 0.05 then$_{H0}$ is accepted and if the significant value <0.05 then$_{H0}$ is rejected. Decision reject H_0 means no influence cognitive competence of learners by using an implementation of *lesson study* in chemistry learning. The decision accepted H_0 means no influence cognitive competence of learners by using the implementation of *lesson study*. In the study showed that the significance <0.05, which means that $H_{0\ is}$ rejected, it indicates that there is the effect of implementation *of lesson study* in chemistry learning to cognitive competencies of learners.

b. Discussion

The positive impact of-based learning activities *lesson study* is that students' cognitive competency is far better than before. The cognitive competence of students here means learning outcomes in terms of cognitive aspects of students. Based on the research data, it is explained that this activity has been able to improve students' cognitive learning outcomes.

Achievement of cognitive learning outcomes of students in lesson study based learning is able to improve student learning outcomes to be better and achieve KKM. Lesson study activities have contributed to improving the quality of learning. The positive impact of lesson study on students' cognitive learning outcomes is because the teacher can evaluate learning in his class with theteam *lesson study* so that improvements occur in the next meeting. The involvement of students who are active in learning activities also has an impact on students' understanding of the material they have built themselves through learning experiences facilitated by the teacher. Students are actively involved in asking questions, digging data / information (both inside / outside the classroom), bringing up ideas / opinions, and collaborating with other friends. This is supported by the results of research conducted by Marhamah (2015) which states that learning through *lesson study is* able to improve the cognitive learning outcomes of STKIP Kamzanwadi Selong students. Sulistiani (2014) in his research also stated that the implementation of *lesson study* at MTsN Rejoso Pasuruan Regency was able to improve student learning outcomes. This proves thatbased learning *lesson study* is directly able to improve learning outcomes (Sato, 2012).

One indicator that can be used as a benchmark for the success of teaching and learning activities is the absorption of the material taught to achieve high achievement, both individually and in groups (Pancojari Wahyono, et.al. 2016). Absorption of the material studied can be seen from the learning outcomes of students. In fact, there are indeed students who still have cognitive learning outcomes in the low range, however, these students are able to empower learning outcomes through learning activities that are attractively designed through *lesson study*. This is in line with Hasanah (2012) research which states that learning outcomes are actual abilities that can be measured and are tangible to mastery of knowledge, attitude skills, and values achieved by students as a result of learning processes.

V. CONCLUSION

The implementation of *lesson study is* able to improve the cognitive competence of students. The increase in cognitive competence in question is an increase in cognitive learning outcomes of students. The cognitive learning outcomes of students beforedone by *lesson study is* the average value of cognitive outcomes of students is 62%, while after *lesson* study the average cognitive outcome of students is 76%. Addition of hypothesis testing showed that the significance of the cognitive competence of learners than 0.05 means that $H_{0\ is}$ rejected, so it can be concluded that there is the effect of the implementation of *lesson study* in chemistry learning to cognitive competencies of learners.

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