

Teacher's Performance in Lesson Study through Experimental Method of the Lesson on Science Subject

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Abstract—The implementation of lesson study in improving the teachers' performance was conducted at Junior High School I in the Katingan state. The research was carried out on the science subject with the basic competency of describing elements, compounds, and solution. The activities of the teaching lesson study consist of Plan-Do-See stages. The Plan activities were carried out by planning the learning activities done by the modelling teacher and eight observers. They are preparing the lesson plan using experiments, arranging the learning scenarios, formulating the observation sheets for the teacher's performance using experimental method and developing the evaluation forms. The do activities were carried out by reflecting on the teacher's performance in the lesson study with the experimental method. The learning activities were observed by eight observers analyzed using qualitative descriptive. The result showed that the teacher's performance in lesson study through experimental method on the lesson were good category of the opening the lessons, explaining the materials, explaining the experiment steps, guiding the experimental activities, guiding the group presentation evaluating the learning process. The excellent category was finding in the communicating with students and observing the students' learning activities.

Keywords—*performance; lesson study; experimental method*

I. INTRODUCTION

The learning process applied by the teacher is still mainly oriented to the transfer of subject matter and still involves conventional methods, especially the lecturing method. Ideally, every educator seeks to create a learning environment that is conducive to improve students' learning abilities. One of the competencies that must be possessed by a teacher in the learning management is the pedagogic competence that has been mandated in the Government Regulation of the Republic of Indonesia Number 74 in 2008. In addition, based on the Government Regulation of the Republic of Indonesia Number 19 in 2005 about the Standards of Educators and Educational

Personnel, pedagogic competence is the ability to manage the students' learning which includes understanding students, designing and implementing learning, evaluating learning outcomes, and developing students to actualize various potentials.

Teachers become one of the components of education that determines the quality of education in Indonesia. Considering the various roles of teachers, it is necessary for them to have professional, creative, and innovative characters and high willingness to continue to learn and be aware of information technology to be able to keep up with the times. The development of professional teachers continues to be pursued by various groups, both the government and the communities, with the hope of improving the quality of education in Indonesia [1]. In principle, the teachers' performance is determined by their personal skills and abilities. The increased achievement and quality of educational experience for all students is what is expected by all schools. The teachers thus become the most important variable to increase the students' achievement.

Improving the quality of education can be done by improving the quality of teachers through lesson study. Lesson study has a simple idea but is a complex process [2]. Lesson study is a systematic process used by Japanese teachers to test the effectiveness of their teaching in order to improve learning outcomes [3]. Broadly speaking, it is used to improve classroom teaching based on a long-term, continuous improvement model, focusing on the students' learning and direct improvement on teaching and collaboration [4].

In Japan, lesson study is a model of teachers' professional development by applying three principles of learning, namely planning (plan), implementing (do), and reflecting (see). Lesson study is expected to improve the creativity and learning outcomes of the students. With the cooperation of several subject teachers, the learning can be directly evaluated. Then,

the evaluation results are directed to the improvement steps in the next learning. Teachers who have learning innovations, such as strategies, methods, media, or new learning resources will "open" the class by inviting several other teachers (colleagues) to deliver the ideas. Next, they carry out the learning based on the lesson plan that has been developed, while the other teachers observe the learning process. After the learning process is over, the group of teachers who observe the learning process discusses the learning practices that have been done and observed. The discussion is intended to find strengths and weaknesses as a bases for developing the next learning.

Lesson study is believed to be able to improve the learning practices with collaborative principles. This is in line with [5], who explained that one of the collaborative principles in lesson study is sharing and giving input. States that lesson study is a collaborative process in which a group of teachers identify the learning problems, plan the improvement goals, carry out the learning (one teacher in the teacher group teaches it, while the other teachers observe it), evaluate and revise the learning, teach the revised learning, evaluate and share (disseminate) the results to other teachers. This has a logical consequence that there is a continuous improvement effort resulting in teacher professionalism. Based on the results of Shahren & Khalid's research [6], lesson study can improve innovative learning practices through reflecting on the teaching practices and have many advantages compared to other professional development programs.

Broadly speaking, lesson study can be defined as a collaborative process of a group of teachers to jointly: (1) identify the learning problems perceived by the teachers; (2) plan the learning steps (as identified problem-solving efforts); (3) carry out the learning conducted by one of the selected teachers, while the other teachers observe the learning process; (4) evaluate the learning process that has been done; (5) improve the lesson plan based on the evaluation results; (6) carry out the revised learning plan; (7) re-evaluate the learning that has been carried out; and (8) share experiences and findings from the results of the evaluation with other teachers.

Lesson study has a positive impact because it is effective to change the teachers' teaching practices such as the use of concrete learning materials to focus on the problem to be more meaningful and the explicit learning context and experience that also provides support to teachers in peer relations. This provides many opportunities for the teachers to create educational ideas in their teaching practices, to change their perspectives about learning, and to learn to observe their teaching practices from the perspectives of the students. In lesson study, they see what happens in learning more objectively and understand important ideas without having to pay more attention to other issues in the classroom.

The results of a research conducted by Listiyani [7], showed that the application of lesson study improves the teachers' pedagogical competence, makes them better in class management, good planning and better media development, so that the students learn more and participate more in the learning (5). In addition, by applying lesson study, the teachers can improve their creativity and motivate the students in learning activities. Each teacher works together to solve the

learning problems and find solutions to the problems faced in the classroom to create a pleasant learning atmosphere in the next meeting. The improvement is related to how the teachers' performance is strived maximally [8].

Cheong, Ming & Tung, explained that the dynamic quality of the teachers in the learning process in general is positively related to the quality of the teachers' competence [9]. The process of developing the teachers' competencies is endless because the educational environment changes so rapidly and through various stages of the cycle with different needs. In general, it must consider the needs and characteristics of the model to be developed. The quality of the teachers' competences can be seen from their performance when carrying out the learning process in the classroom. The research aimed to analyze teacher performance in managing the learning in the classroom from several aspects, opening lessons, communicating with students in the classroom, explaining the materials to the students, explaining the experimental steps, guiding the experiments, observing the students' learning activities, guiding the group presentation and evaluating the learning. In other words, to realize good performance, the teachers must always develop their pedagogical competence [10].

II. METHOD

This research was conducted at Katingan I Junior High school in Odd Semester, 2017. The subjects were 21 grade VII students consisting of 13 male and 8 female students. The research was carried out on the science subject with the basic competency of describing elements, compounds, and mixtures. The teachers are from other schools. The activity of the teaching lesson study begins with Plan-Do-See stage. The Plan activities were carried out by planning the learning activities between the model teacher and eight observers, namely preparing the lesson plan that involves experimentation, learning scenarios arrangement, observation sheets formulation for the teacher's performance using experimental methods and evaluation forms development. The Do activities are activities in the teaching process in the classroom, where the teacher's performance in the activity is observed under several indicators, namely: the teacher's performance in opening the lesson, the teacher's performance in communicating with the students, the teacher's performance in delivering the materials, the teacher's performance in explaining the steps of the experiment, the teacher's performance in guiding the experiment, the teacher's performance in observing the student's learning activities, the teacher's performance in guiding the group presentation, the teacher's performance in evaluating the students' performance. The See activities were carried out by reflecting on the teacher's performance in the lesson study with the experimental method. The learning activities were observed by eight observers with an assessment rubric using a Likert scale and analyzed using qualitative descriptive analysis.

III. RESULT AND DISCUSSION

The teachers' teaching performance in the learning process about elements, compounds, and mixtures in class VII of Katingan Junior High School I involved lecturing method,

discussions and experiments. The teacher's performance was related to the lesson study activities in the Plan-Do-See stage. The results of the lesson study can be described in several aspects, namely: the teacher's performance in opening lessons, the teacher's communication, the teacher's performance in delivering material explanations, the teacher's performance in explaining the experimental steps, the teacher's performance in guiding the experiment, the teacher's performance in observing the students' learning activities, the teacher's performance in guiding group presentations, and the teacher's performance in evaluating the students' performance.

Based on the observation results related to the teacher's performances in conducting the learning about describing the elements, compounds, and mixtures using the lecturing method, experiment and discussion can be improved. The students' learning activities and the teacher's teaching performance were dynamic. The learning goal of the basic competency is to describe elements, compounds, and mixtures and to provide an understanding of the everyday events that occur around the students' environment through describing the elements, compounds, and mixtures that occur in the experimental activities. For instance, sugar dissolves in water, while sand cannot dissolve in water. The process of such a chemical reaction in solution can be found by the students in their daily lives. Table 1 illustrates the observation results about the teacher's performance using the experimental method in relation to the students' learning activities about describing elements, compounds, and mixtures in Class VII of Junior High School I Katingan.

TABLE 1. THE AVERAGE OF TEACHER'S PERFORMANCE THROUGH EXPERIMENTAL METHOD ABOUT ELEMENTS, COMPOUND, AND MIXTURES

Indicators	Average	Category
Opening the lesson	3.75	Good
Communicating with students	4	Excellent
Explaining the materials	3.625	Good
Explaining the experiment steps	3.875	Good
Guiding the experiment activities	3.750	Good
Observing the students' learning activities	4	Excellent
Guiding the group presentation	3.625	Good
Evaluating the learning process	3.375	Good

Note: 0-1,9: Poor; 2,0-2,9: adequate; 3,0-3,9: good; 4,0: excellent

The teacher's performance in opening the lesson aims to prepare the students' mentality, interests and motivation so that it attracts the students' attention to be able to participate in the lesson. The teacher's performance in this stage has got good category, which was seen from the enthusiasm of the teacher in interacting with the students, greeting the students by introducing themselves, explaining the learning objectives to be achieved, exploring the students' behaviors related to the concept of elements, compounds, and mixtures. Some of the things that must be improved in the teacher's performance in this stage were on the students' mental preparation, interest and motivation. It was because the process was not done by giving controversial issues through stories, pictures, or videos related

to the materials. The provision of controversial issues can be explored by the teacher by utilizing technology through internet to look for problems in their surroundings; for example, about simple events that occur in the students' environment through the exploration of an image, video and story [11-13].

Another indicator is on the teacher's performance in communicating with the students. This can be done through verbal and non-verbal fashions. The observation results showed that in average all observers gave excellent ratings. It was evidenced by the fact that the teacher conveyed the messages in a clear, systematic, and easily understood style by the students. Although many students used non-Indonesian language in their daily lives, they used Banjar or Dayak language as the social language. The teacher in this case also has Dayak socio-cultural background. Every day, the language used by the teacher was not Indonesian, but in the learning process the teacher was very good at using Indonesian language as the national language in conveying the messages in the learning process. In the classroom, the teacher used the national language properly and correctly so that the learning messages can be understood by all students even though they have different cultural and linguistic backgrounds and different levels of cognitive development. They could understand the messages deeply through communication conducted by the teacher [14-17].

The teacher's quality of teaching is also determined by the ability to explain the materials. Clarity of the materials can be influenced by several factors, namely: the teacher's mastery on the materials, clarity of the language used, strategies used by the teacher related to the selection of the points to be explained, use of delivering methods, and use of instructional media adapted to the students' characteristics. Overall, the teacher's teaching performance in explaining the materials about elements, compounds, and mixtures in class VIII of Katingan Junior High School was in the good category. This can be seen from the selection of the points that have been arranged systematically. The language used is clear and understandable. The mixed usage of lecturing method, experiment, and group discussion supported by the use of PowerPoints. Some things that must be improved in this stage was the teacher's understanding of the students' characteristics in the classroom in which not all students were active in the learning activities. This needs to be considered by the teacher; one of which is by making a personal approach to the less active students [18-20].

The teacher's performance in explaining the experiment steps becomes another influential indicator to be observed by using the experimental method. Explanation of the experiment steps is needed so that the students can understand the stages of the learning process that must be done when they are doing an experiment. In general, the teacher's performance in explaining the experiment steps was in the good category. This can be seen when the teacher verbally conveyed direction to all students who would carry out the experimental activities with two activities, namely mixing sugar and water, and mixing sand and water. The things that must be developed by the teacher in explaining the experiment steps were that the steps should be explained in verbal and written modes in detail. It is intended to make the students not confused at what activities

should be done in the experiment. If only delivered verbally, the students find it difficult to remember the full information about the experiment steps delivered by the teacher. In addition, the experiment steps must have a standard operating procedure (SOP) so that the students can take the same steps as expected with the expected goals [21-23].

The teacher's performance in guiding the experimental activities was observed in the learning process where the teacher must be able to manage the classroom activities. The role of a teacher in guiding the experimental activities is very important because the position of the students is still in the process of learning, so they need guidance from the teacher. In the implementation of science learning, the teacher must be able to manage the class well. This is in line with Milan who explains that the conditions built in the learning process determine the success of learning [24]. The performance of the teacher in guiding the experimental activities about elements, compounds, and mixtures in class VIII of SMP I Katingan was in the good category. The teacher did so by looking at each group to guide the experimental activities. Natural Science is a science that requires a combination of knowledge of ideas, and organized systematically logistical concepts about the natural surroundings, which are obtained through a series of scientific activities, such as observation, investigation, hypothesis preparation followed by testing ideas. The science learning process emphasizes more on real learning experiences that involve all the abilities and potential possessed by the students, including the process of guiding experimental activities [25].

As mentioned before, the sixth observed indicator is the teacher's performance in observing the students' learning activities. It can be seen from the classroom management carried out by the teacher, especially in order to create good teaching and learning condition. Conditioning the learning process in a good atmosphere will affect the success of the students' learning process. Designing a good learning process opens opportunity to minimize learning failures. This is in line with Suryana's [26], opinion who states that a teacher's classroom management skill is related to the skill of creating and maintaining optimal learning condition, and the skill to restore optimal learning condition. The ability to manage the class can be seen from the carefulness of the teacher in observing the students' activities. From the lesson study learning process it can be identified that the teacher played an active role in the classroom management process especially in observing the students' learning activities. Thus, the teacher's performance in observing the students' learning activities was in the excellent category. It was evidenced when the learning process took place, the teacher approached the students who did not pay attention to the learning process because they played a game. The teacher gave advice to pay attention to the lesson. The students' learning activities are always dynamic in a learning process. Some students are good, while some others are lacking and it always changes. It will not remain on the same learning activity. In other words, the students' learning activities can go up and down. To improve the teacher's performance in the classroom management process, the learning management process must be designed and managed optimally so that the learning objectives are achieved.

Next, the teacher's performance in guiding the group presentation is also influential. A teacher must be able to guide the group presentation process and be fair to all groups. Besides, the teacher must also be able to guide each group to be able to deliver the materials that have been made for other students. The teacher's performance in guiding the presentation about elements, compound, and mixture was in the good category. In the lesson study, it was evidenced that the teacher was able to guide each group to deliver the results of the discussion. However, in presenting the materials, the students were still transfixed with text without any improvisation. This is a challenge for the teacher to guide students to be able to improvise and explore the materials while delivering it. In addition, the students had not shown their performance optimally. The ability to develop themselves at the time of presentation was still lacking; one of which is due to lack of ability to argue. Considering this situation, the teacher must be able to guide each student to have the ability to present the work to other friends. In principle, the students must be taught to be able to collaborate in conveying ideas with other students. In digging up information and making meaning, the students are encouraged to be able to collaborate with friends in their classroom. In doing so, they need to be taught how to appreciate strengths and weaknesses of each group member and how to take roles and adapt themselves appropriately in the group [27].

The last but not least indicator to take into account is the teacher's performance in carrying out the evaluation on the learning process. A teacher must be able to develop an evaluation instrument for the learning process that has been done to find out the achievement of the learning objectives [27]. Assessment is a key part of learning activities. By conducting an evaluation process, the teacher can find out the level of students' understanding. Meanwhile, the students can use it as feedback about the weaknesses and strengths in learning the materials. Through assessment, the teacher and the students can do self-introspection and can be used as a reference in the preparation of the next learning activities. In addition, it is often used as a basis for measuring the success of a learning process and is implemented as a benchmark for understanding the students in the learning activities. Regular evaluation can be carried out in the form of tests conducted at the end of learning activities [28]. The teacher's performance in evaluating the learning process was in the good category. In the lesson study process, at the end of the learning process there was no explicit evaluation of the questions compiled by the teacher. However, the evaluation was carried out during the learning process by working on the questions in the Student's Worksheet (LKS).

IV. CONCLUSION

Based on the research findings related to the teacher's performance in lesson study using experimental method about elements, compounds, and mixtures in grade VII Odd semester at Junior High School 1 Katingan in the academic year 2017/2018 can generally be categorized as good. the teacher's performance in lesson study through experimental method on the lesson were good category of the opening the lessons, explaining the materials, explaining the experiment steps,

guiding the experimental activities, guiding the group presentation evaluating the learning process. The excellent category was finding in the communicating with students and observing the students' learning activities.

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