Lesson study at Bengkulu Iqro IT High School to improve learning outcomes and the role of teachers in supporting Biology learning

A Y Zukmadini1,* and S Rochman2

1 Program Studi Pendidikan Biologi, Universitas Bengkulu, Jl. WR Supratman, Kota Bengkulu 38371 A, Indonesia
2 Program Studi Pendidikan IPA, Universitas Bengkulu, Jl. WR Supratman, Kota Bengkulu 38371 A, Indonesia

*ayzukmadini@unib.ac.id

Abstract. Iqro IT High School is one of the high school level schools based on Islam in the city of Bengkulu. This study aims to improve the learning outcomes of class XI students and enhance the role of teachers in enhancing collaborative biology learning. This type of research is action research conducted using the lesson study method. Lesson studies are carried out collaboratively by involving the roles of teachers, peers, and lecturers. Lesson study activities carried out in two open lessons, where each open lesson consists of 3 sessions namely plan, do, and see. The instrument used in this study was the observation sheet of the implementation of lesson study and the test sheet of learning outcomes. The results showed an additional increase in the study of lessons from open lesson 1 to open lesson 2. In addition, there was also an increase in learning outcomes from open lesson 1 to open lesson 2. The conclusion of this study is that lesson study can help teachers to enhance their role in teaching and learning and be able to improve student learning outcomes in biology subjects.

1. Introduction

The teacher is the most important factor that strongly supports a learning process. Professionalism of teachers in teaching is needed so that the quality of the learning process [1]. Personal factors such as professional skills in learning are important in effective learning management [2]. In this case, the management of learning relates to students, teaching styles, management planning, and student settings [3]. Pedagogic learning about learning planning has an important role because good learning planning really determines learning in the classroom, and also determines the effectiveness of the learning process. Effective learning is very helpful for students to learn [4].

Biology is a subject given to high school students in class XI. This course discusses laws, theories, concepts about life and interactions with the environment. From the results of interviews with Biology IT Iqro high school teachers in Bengkulu-Indonesia, it was known that student learning outcomes in class XI were not optimal. This can be seen from the learning activities. From the results of evaluating student learning outcomes, only 30% of the total number of students were actively involved in discussion activities to explain their ideas and opinions about learning concepts. About 60% of students still rely on biological concepts in the book, 40% of students have not been able to express arguments and connect one concept to another based on analysis and critical thinking about each of the talks. From the
interviews also obtained information about learning activities that are very satisfying to the concepts in the book, and only about 20% of the learning process is carried out on the third day. When compared with the previous problem conducted by researchers, in this study the most dominant is the tight teaching schedule of teachers, so that teachers do not have careful planning in preparing learning plans, implementing learning, and reflecting learning activities.

From the results of interviews and preliminary observations conducted by researchers regarding the learning process in SMA IT Iqro Bengkulu City, obtained information about learning activities carried out in very dense schools, where learning activities are carried out in full. The existence of high class response time, causes teachers rarely make plans or carry out collaborative learning. Just talking about the question and answer method, presentation, and practice. Because this is crucial to the development of students' learning outcomes in biology subjects.

Good teaching and learning planning skills will have a positive influence on student learning outcomes. Therefore, to improve the well-planned learning process and improve student learning outcomes. It will be applied through lesson study activities. Lesson study (LS) aims to train educators or prospective educators to become independent learners, responsible, skilled in communication, and collaborating. The lesson study process includes 1) problem definition 2) learning planning 3) implementation of learning 4) evaluation of learning and reflection 5) revision of learning [5-7]. Lesson study was chosen as an alternative because it can improve the quality of learning and activities of students including: a) development of Lesson study conducted and based on the results of "sharing" professional knowledge based on the practices and results of teaching carried out by teachers; b) a fundamental emphasis on Lesson study, namely the quality of learning of students; c) the objectives of the lesson are made the focus and the main point of attention in learning in the classroom; and d) Lesson study will place the primary role of educators as learners researchers. Therefore, in this study lecturers and teachers will act as a team in planning, implementing, and reflecting learning activities in schools. Basically lesson study is a research lesson conducted to improve the learning process. Lesson studies are similar to action research that guides teachers to conduct collaborative learning research through the stages of planning, observation, and reflection [8,9].

The basic concept of lesson study is to learn how to improve and develop learning in real efforts [5]. Cycle learning is carried out through an activity called planning-doing-seeing [10]. Learning cycle includes several stages of collaborative planning, observation of learning by colleagues, analysis and reflection, and revision [11]. Implementation of lessons is very supportive as an excellent aid to support the development of teacher professionalism [10].

2. Methods
This research was conducted from June to December 2019 on biology students in class XI high school. Research place in class XI IT Iqro high school Bengkulu City-Indonesia. This type of research is a classroom action research (CAR) conducted using a qualitative descriptive approach. This research was conducted in 2 open lessons, in each open lesson (OL) conducted Lesson study (LS) which includes the stages of the plan, do, and see. Researchers and teachers in this case play the role of the LS team. The lecturer will collaborate with the teacher to carry out planning activities (plan), implementation activities (do), and reflection activities (see). in each cycle the PBL will be implemented to improve students' critical thinking skills. Research data in the form of the results of monitoring the implementation of lesson study and data on critical thinking skills of students. For student learning outcomes data obtained from the results of student cognitive tests conducted at the end of learning.

3. Results and discussion
The results obtained from this study in the form of data regarding 1) the implementation of lesson study at each stage and 2) data on student learning outcomes. The average score of the implementation of lesson study in open lesson 1 is 84.06% (with details of the stage plan of 100%, 64.70% of the do phase, and 87.50% of the see phase). The average score of the lesson study in open lesson 2 was 86.27% (with
a detailed plan stage of 100%, a do stage of 58.82%, and a stage of seeing 100%). For data on the exclusion of each lesson study in each open lesson can be seen in Figure 1.

Figure 1 shows that the implementation of lesson study in each of the open lesson activities has been carried out well, especially at the planning stage. In the plan activities in open lesson 1 and open lesson 2, all aspects of lesson study in the learning planning activities have been carried out. This can be seen from the percentage of implementation of the plan stages in open lesson 1 and open lesson 2, which is 100%. At this stage there is discussion about the learning objectives to be achieved by students, the form of apperception to be carried out, the learning methods to be used, the learning media to be used, the learning material, and the learning evaluation design to be used. The plan activity involved a lesson study team consisting of teachers, lecturers, and observers. At this stage the activities are carried out collaboratively, this aims to make the learning activities to be carried out well planned so that the learning objectives can be achieved. Learning planning activities carried out with the team, allowing teachers to exchange experiences and get input from other teams. In lesson study activities, learning planning includes planning and reflection of learning that is carried out collaboratively [10].

Teachers at Iqro IT High School were very rare to do collaborative learning planning together with other teachers. This is due to the busy teaching schedule so that teachers do not have enough time to discuss and exchange ideas. Through lesson study activities, the teacher and the research team together develop a learning strategy to be carried out. This certainly has a positive influence on learning outcomes, where learning objectives can be achieved effectively and efficiently. Lesson study will improve the quality of teaching and learning objectives become easier to achieve because there is good and unified collaboration between teachers [12]. Through lesson study, teachers can be actively involved in the learning process and curriculum development [9].

For do (action) activities, at this stage the teacher implements learning in accordance with a collaborative learning plan. When the teacher conducts the learning and teaching process, the other lesson study team acts as an observer, noting important things or findings during the learning process. At the plan stage, although the implementation did not reach 100%, overall the implementation of the learning process went well. Teachers become more confident and able to develop their abilities when teaching. In the implementation of learning activities in Islamic-based schools, in principle in this school has a different layout plan where students sit. Where the seats of male and female students have a partition, so that during the learning process takes place male students and female students cannot interact with each other. Nevertheless, the implementation of learning activities can still take place very
well, because the teacher is the center of student learning when in the classroom. The teacher is still able to teach well and still has the freedom to facilitate male and female students. This also makes learning activities carried out by students and teachers become more increased. Students are actively involved in discussions, questions and answers and opinions. This is consistent with research which states that lesson study can improve student learning activities [13]. The increase in learning activities in Iqro IT High School is strongly influenced by the good education management process which is carried out through lesson study at each stage. This is consistent with the opinion which states that lesson studies conducted based on learning management affect student learning activities [14].

For reflection activities at the lesson study stage, after the do (action) activity is carried out. This activity aims to evaluate the learning process that has taken place. In this reflection activity a discussion is held to discuss the things that are felt by the teacher and the findings obtained by the observer, so that they can be suggestions for improving the learning process in the next open lesson. This is in accordance with the opinion [15] which states that the final process of lesson study activities is a reflection, at this stage it discusses the notes on learning activities found by the observers during the lesson study observation. The reflection stage refers to the lesson study observation sheet which describes the things that need to be observed by the observer when implementing learning. In the reflection activity the teacher can give suggestions to the model teacher to be able to develop their learning activities [14].

In the reflection activity, the teacher feels an increase in the quality of learning compared to learning activities carried out without lesson study. This is because the teacher becomes more confident and has optimal preparation especially during the learning planning stage. This is in accordance with the opinion which states that lesson study focuses on two things, namely improving learning planning and building for better teaching so that student learning activities increase [16].

During reflection, the teacher and the study team can develop understanding and find them while carrying out learning. This is in accordance with the opinion which states about the understanding of learning that can be developed and can change through discussions related to LS [17]. In Lesson Study activities conducted by teachers, the teacher's pedagogical ability to support development. The teacher has new experiences and abilities in completing learning, determining methods, determining learning media, to classroom management. This is in accordance with the opinion which states that lesson studies are able to build teacher's pedagogical knowledge in carrying out learning in the classroom [18].

The development of pedagogical skills is strongly influenced by the collaboration between the lesson study teams, thus providing a positive influence on the development of teacher professionalism in teaching. Collaboration with colleagues is very valuable for the development of teacher professionalism in teaching [9]. One of the important roles of teachers in classroom teaching is the development of teaching professionalism and the achievement of learning objectives themselves. Lesson study can improve the professionalism of teachers in teaching and student learning outcomes [19], it's just that being able to apply lesson study requires more time and good preparation for data on biology learning outcomes of students in each open lesson can be seen in Table 1.

| Open lesson | Average value of learning outcomes | Criteria   |
|------------|----------------------------------|------------|
| I          | 78                               | Good       |
| II         | 89                               | Very Good  |

Table 1 shows the results of the implementation of study lessons conducted in 2 open lessons obtained data that increased student learning outcomes during learning. Improving learning outcomes is truly challenging with teachers who collaborate in developing learning evaluations. After the learning process ends, at the end of the session the teacher gives a test aimed at measuring students' thinking abilities. Test instruments are made with good planning together with team lessons. Managing planned learning, starting from the plan, doing, and seeing can improve the teaching profession in learning so as to improve the improvement in student learning outcomes [14]. To be able to apply the lessons it takes
time for the teacher to prepare things from all the lessons. In this case students also assume that the teacher’s needs need a certain amount of time and preparation to achieve the desired learning outcomes [20]. Increasing student learning outcomes through the application of lesson study, showing learning lessons can improve student learning outcomes. Learning in science by lesson study is able to provide learning processes that can create an effective learning atmosphere making students able to learn well and work together [21].

4. Conclusion
Based on the results of research conducted, it can be concluded that lesson study can help teachers to enhance their role in teaching and learning and be able to improve student learning outcomes in biology subjects.

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