

## IMPROVING THE QUALITY OF SCIENCE TEACHING THROUGH LESSON STUDY

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### ABSTRACT

Improving the quality of learning is inseparable from the role of teachers in managing learning, especially in developing learning materials and learning methods, evaluating the results of learning activities, and utilizing feedback on the results of evaluating learning activities. science teacher activity group is expected to assist teachers in carrying out learning in the classroom through discussion and exchange of opinions among members as well as curriculum training tailored to teacher needs. However, since the pandemic, the activities of science in junior high school have not run as they should; this has an impact on the quality of learning where currently teachers are unable and have difficulty implementing an independent curriculum in science learning. Thus, this activity aims to empower groups of science teachers who are members of the Science teachers through Lesson Study-based assistance in improving the quality of learning through increasing teacher knowledge about the implementation of the independent curriculum and independent learning platform, as well as increasing teacher creativity in making student diagnostic assessments with the ultimate goal of producing electronic modules of science learning based on the independent curriculum. The output resulting from this service activity is the empowerment of partners through increasing knowledge and skills. Another impact of this mentoring activity is that teachers become more creative and innovative in developing science learning by utilizing information technology.

**Keywords:** Lesson Study, Quality Teaching, Science

### 1. INTRODUCTION

Science Learning has a very important role in shaping students' understanding of natural phenomena, scientific methods, and technological developments. To achieve the goal of effective science learning, the quality of teaching provided by science teachers must be improved on an ongoing basis. In this context, Lesson Study emerged as a very relevant approach and has the potential to improve the quality of science teacher learning.

One approach that has proven effective in improving the quality of science teaching is Lesson Study. Lesson Study is a collaborative method that involves a group of teachers in planning, implementing, and co-evaluating lessons with the aim of improving their teaching practice (Leavy & Hourigan, 2016). This approach was first developed in Japan and has become an internationally recognised model for teacher professional development and learning quality improvement (Gutierrez, 2015).

However, in many places, lesson study has not been widely used in the teaching of science. Some of the challenges faced in implementing Lesson Study include lack of understanding of the concept of Lesson Study, limited time and resources, and lack of support from schools or educational institutions.

based on the results of research (Safriana et al., 2023) which states that science teachers in Lhokseumawe City are able to use technology but are still weak in implementing it in science learning. In addition, teachers are also still constrained in designing literacy and numeracy-based science learning that refers to the independent curriculum. So far, teachers carry out remedial, reports and implementation that are different due to conditions that have not been possible so that many learning activities are not appropriate and not recognized by the government because the implementation is not appropriate (Gutierrez, 2015). This is evidenced by the results of the Lhokseumawe City Junior High School Education Report known that students' literacy and numeracy skills are still below the minimum competence where less than 50% of students have reached the minimum competency limit for literacy and numeracy. Of course, if this continues

to be allowed to continue, it will have an impact on the quality of science learning and the quality of students.

To overcome these challenges and improve the quality of science teaching, serious efforts are needed in developing Lesson Study as a key tool in teacher professional development and improvement of teaching practices (Açıkgül & Aslaner, 2019). Thus, this background highlights the importance of improving the quality of science teaching through Lesson Study as a strategic step in preparing students to face increasingly complex future challenges in the field of science and technology. Lesson Study is a professional development method that involves working together between a group of teachers in planning, implementing, and evaluating lessons together. The Lesson Study process is designed to improve teacher teaching practice through continuous reflection and experimentation with new ideas (Coenders & Verhoef, 2019).

Although Lesson Study offers great potential to improve the quality of science teaching, there are still many science teachers who are not familiar with this concept or experience obstacles in implementing it. Therefore, this background emphasises the importance of improving the quality of science teacher learning through Lesson Study as a real effort to strengthen teacher understanding and skills and to improve the overall quality of science education. Thus, Lesson Study can be one of the solutions to face the challenges in science learning in this dynamic educational era.

## **2. LITERATURE REVIEW AND HYPOTHESIS**

Lesson study activities involve a small group of teachers planning together a series of lessons based on shared learning objectives for students, with one teacher leading a constructed lesson together and their colleagues invited to observe student learning in the lesson. The team then developed their learning further based on the feedback (Murphy et al., 2017) In addition, (Nursafitri, 2015) added that a Lesson Study is an activity that can encourage the formation of a learning society that consistently and systematically makes self-improvement, both at the individual and managerial levels.

Lesson study provides several benefits, including; (1) teachers can document their work progress, (2) teachers can get feedback from other members/groups, and (3) teachers can publish the final results of lesson study. Lesson study is not a teaching method or not a learning strategy but lesson study is a model of teacher professional development through teaching and learning (learning studies) collaboratively with a cyclical and continuous system based on the principles of collegiality and mutual learning to build learning. Lesson study. According to (Fujie, 2019) Lesson Study, a form of research on teaching by teachers, creates learning opportunities for teachers. Lesson Study is a collaborative process in which teachers observe, analyze, and evaluate each other actual classroom lessons with the goal of improving their lessons. In a typical Lesson Study stream, classroom lessons are observed by other teachers, and this is followed by a conference where observers present analysis and interpretation of lesson elements such as teacher and student specific actions during the lesson, lesson content and teaching materials, learning styles, and educational objectives. The teacher administering the lesson reflects on the lesson, his professional competence and other relevant matters. One cycle of Lesson Study is completed when teachers are observed and observers apply findings from the conference to design their respective lessons in the future. This suggests that Lesson Study serves as a learning opportunity for teachers, as it is said that teachers learn by example (Sam et al., 2014) In the context of science teaching, Lesson Study offers valuable opportunities to:

1. **Teacher Skill Development:** Science teachers need to continuously improve their understanding of the development of science and technology. With Lesson Study, teachers can collaborate in designing and testing teaching approaches that are appropriate to the latest scientific discoveries.
2. **Improved Teaching Methods:** Lesson Study allows science teachers to try more innovative and effective teaching approaches. Teachers can identify teaching strategies that best suit student needs and continually improve them based on the results of joint evaluations.
3. **Deeper Understanding:** Science is a subject that requires a deep understanding of natural concepts and phenomena. Lesson Study allows teachers to approach these topics in greater depth and helps students understand them better.
4. **Student-Focused Learning:** Lesson Study promotes a student-focused teaching approach where teachers understand the individual needs of students and can adapt their teaching accordingly.

Based on the above theory, the hypothesis in this study is that lesson studies are able to improve the quality of science teacher learning in a real effort to strengthen teacher understanding and skills and to improve the overall quality of science education.

### 3. RESEARCH AND METHOD

This research method used action research based lesson study approach. This research was conducted on science teachers in junior high schools in Lhokseumawe city. There were a total of 25 teachers served as the participants. The data were collected through observation methods and questionnaires. The data analysis was conducted through descriptive methods. Consisting of data reduction, data presentation, and conclusion. The data validation was done through technique, method, and source triangulation—the improvement of teaching quality of science teachers through observation methods, and questionnaires. The data collected from observation and questionnaires were presented descriptively and were analyzed by using the Miles & Huberman method.

#### Data analysis method

The data collected from observation and questionnaires were presented descriptively and were analysed by using the Miles & Huberman method. Qualitative data analysis techniques according to Miles & Huberman (Sugiyono, 2013) are carried out interactively and take place continuously until complete, so that the data is saturated. Activities in data analysis are carried out by reducing data (sorting important, relevant and meaningful data from useless data), descriptive presentation (narrative, visual images, tables) and drawing conclusions / verification of the results presented. table) and conclude/verification from the results presented. Kategori kualitas pembelajaran IPA dapat dilihat pada table 1.

Tabel 1. Assessment Category

Category	Range of values
Low	0 < 60
Enough	60 - 79
Good	80 - 89
Very good	90 - 100

### 4. RESULT AND DISCUSSION

The application of the Lesson Study that has been carried out in the Lhokseumawe city science teacher group consists of four stages of Plan-Do Check-Act (PDCA). (1) Planning Stage (Plan): In This stage (planning stage), science teachers who are members of the Lesson Study collaborate to compile lesson plans that reflect student-centered learning; this activity analyses the needs and problems faced in learning; furthermore, together solutions are also sought to solve all problems found. The conclusion of the results of the analysis of needs and problems is part that must be considered in the preparation of Teaching Modules in accordance with the implementation of the independent curriculum. (2) There are two main activities, namely: (a) learning implementation activities carried out by one of the agreed teachers or at their request to practice the RPP that has been prepared together, and (b) observation or observation activities carried out by members of science teachers group or other Lesson Study communities (teachers, experts/experts and students act as observers/observers), (3) Reflection (Check) stage This stage is very important, because of efforts to improve the learning process. Reflection activities are carried out in the form of discussions followed by all Lesson Study participants guided by the head of the science teacher group or other designated participants. The discussion starts by conveying the impressions of teachers who have practised learning, by conveying comments or general impressions or special impressions of the learning process they do, for example, about the difficulties and problems felt in carrying out the lesson plans that have been prepared. (4) Follow-up Stages (Act): The results of reflection can be obtained from a number of new knowledge for the improvement and improvement of the learning process, both at the individual and managerial levels. At the individual level, various valuable findings and inputs submitted during discussions in the reflection (check) stage are certainly an asset for teachers, both acting as teachers and observers to develop the learning process in a better direction (Vermunt et al., 2019).

The results that have been achieved during the implementation of activities based on the results of before and after lesson study obtained that the quality teaching of science teachers has increased.

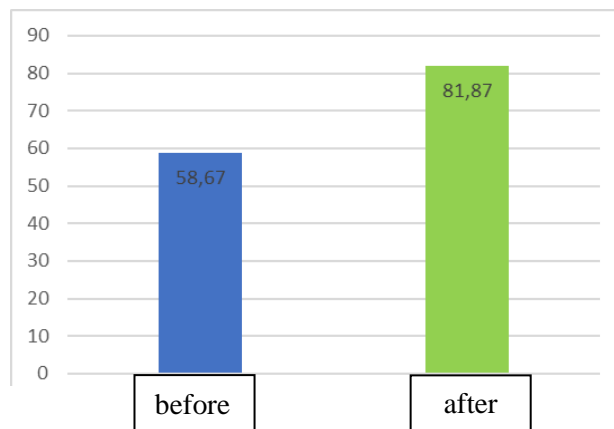


Figure 1. The average result of the quality of science teacher learning

Based on the picture above, it is known that after participating in lesson study activities, the quality of science teacher learning increased to 81.87% with the category very good than before in the category low. With a percentage increase of 23.2%. So it can also be said that lesson study has been implemented is very good. The increase in teacher understanding is also in accordance with the teacher's ability to implement an independent curriculum in the teaching module (Rochintaniawati et al., 2019). In addition, based on observations during mentoring activities in schools, it is known that junior high school science teachers are able to apply non-diagnostic assessments and digital-based teaching media but still need to be strengthened in classroom management and creative learning on an ongoing basis. The teaching modules produced during the lesson study activities are as many as 14 modules with the topic of science teaching materials consisting of (1) principal quantities and derivative quantities with PBL and DL learning models, (2) substances and their changes with the 4C model learning model, (3) the human digestive system with its functions with the PBL learning model, (4) properties and characteristics of substances with the DL learning model, (5) Healthy diet with PBL learning model, (6) measurement with PBL learning model, (7) Cells and life organisation system with DL learning model, (8) Addictive substances with PBL learning model, (9) standard and non-standard unit quantities in measurement with DL learning model, (10) measurement with various types of measuring instruments with face-to-face learning model with scientific learning strategy, (11) temperature and heat with DL learning model, (12) cell recognition with PBL learning model.

## 5. CONCLUSION

Based on the results achieved, it can be concluded that the lesson study method can be applied to improve the quality of science teacher learning, in addition, the method is also able to improve the teacher's ability to compile teaching modules based on an independent curriculum, understand the learning styles of students using diagnostic assessments and apply digital-based media in classroom learning.

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