

PAPER • OPEN ACCESS

Lesson study stimulated students critical thinking in Cell Biology courses

To cite this article: T Hidayat and S Santoso 2021 *J. Phys.: Conf. Ser.* **1731** 012016

View the [article online](#) for updates and enhancements.

You may also like

- [Student discussion skill activities on microbiology courses through lesson study](#)
N Murniati, H Susilo, D Listyorini et al.
- [Lesson study: Increasing mathematical critical thinking ability?](#)
F Ferdianto and N B Ningrum
- [Development of lesson study for learning community based learning tools using google classroom media and its impact on students' creative thinking skills](#)
N Hasanah, Hobri, M Fatekurrahman et al.



ECS
The
Electrochemical
Society
Advancing solid state &
electrochemical science & technology

DISCOVER
how sustainability
intersects with
electrochemistry & solid
state science research

Lesson study stimulated students critical thinking in Cell Biology courses

T Hidayat^{1,*} and S Santoso²

¹ Program Pascasarjana Magister Pendidikan Biologi, Universitas Muhammadiyah Bengkulu, Jl. Adam Malik KM.9, Kota Bengkulu 38229, Indonesia

² Program Studi Pendidikan Biologi, Fakultas Keguruan dan Ilmu Pendidikan, Jl. Bali I, Bengkulu 38119, Indonesia

*tomihidayat@umb.ac.id

Abstract. The purpose of this study is a lesson study joint learning forum for mutual learning from experience in order to stimulate critical thinking of students in the Cell Biology course in the Biology Education Study Program FKIP Muhammadiyah University of Bengkulu. This research is an action research with a qualitative-descriptive approach carried out for 4 cycles. The stages of the lesson study are learning planning (plan), Implementation of learning (Do) and Reflection (See). The results showed that students critical thinking skills in learning Biology Cells through the implementation of lesson studies gained an average score of 85% in either category. The development of the ability to manage classes that have been done through the implementation of lesson studies to stimulate students' critical thinking has increased.

1. Introduction

Lesson Study is an alternatives method to overcome the problem during less effective learning practices. As understood, the practice of learning in Indonesia in general tends to be conducted conventionally through oral communication techniques. This kind of conventional learning practice is more teacher teaches (teacher-centered) rather than how students learn (student-centered). Overall trend showed that such kind method did not contribute much in improving the quality of the learning process and student learning outcomes [1].

Unfortunately, it is not easy to change the habits of conventional learning to student-centered learning, especially teachers. In this case, Lesson Study seems use as an alternative to encourage changes in learning practices in Indonesia towards a more effective culture [2].

Lesson study activities to conduct collaborative and sustainable learning assessments based on the principles of collegiality and mutual learning can build learning communities [2]. Lesson Study is actually a vehicle for lecturers / teachers to develop their professionalism. The main principle of Lesson Study is the gradual improvement in the quality of learning by learning from one's own experience and those of others in conducting learning activities [3]. Student performance in learning becomes the most important part in the learning process, interaction between student-student, student-lecturer, student-instructional material and student-environment, are matters of concern. Lesson studies basically follow the Plan-Do-See pattern. In the plan phase, a group of lecturer prepares and discusses a learning arrangement, In the Do phase, an appointed (model) lecturer implements learning by being observed by



the observer (open lesson). Following the implementation, a reflection (see) phase is carried-out to overview the completion of open lesson [1].

Direct learning observation in lesson study is very beneficial for lecturers and educators. The assessment of student development and learning outcomes is not enough to be seen from the test results sheet and the lesson plan, but also needs to be seen directly in the learning process. Making direct observations in class during the learning process takes place, will be far more accurate and complete, even to the details even though it can be known. The use of video in the learning process can be done as a complement and not as a substitute [4]. Lesson study conducted by researchers is expected to be able to stimulate students' critical thinking. Someone who has critical thinking skills is able to analyze arguments, bring up problems, find cohesive and logical reasoning. Meanwhile, someone who has critical thinking skills tends to produce something creative and original. Both types of thinking are very important for prospective teachers to have.

Teachers must have the ability to think creatively and think critically in order to be able to do higher quality learning while at the same time being able to provide debriefing to students to improve their critical thinking and creative thinking skills. High Order Thinking Skill (HOTS) does not develop without effort explicitly and deliberately implanted in its development [5]. Critical thinking skills and creative thinking skills are teaching skills of 21st century [6]. Through critical thinking skills a student teacher candidate is expected to be able to carry out learning in order to prepare students to be able to understand the content, processes and applications in the field of Cell Biology.

Discussion on Cell Biology related to the structure and function of cell organelles, cell plasma membranes, metabolism, cell division, and transport of substances to membranes and cell abnormalities are some of the materials that are difficult to explain to students. Because the material is abstract, students find it difficult to understand the concepts of phenomena, interconnectedness, and the mechanism of cells in tissues [7]. There are still many students who are unable to understand the material contained in learning Cell Biology [8]. This is because students are not able to develop the ability to think to answer a problem. Students memorize more concepts that occur in cells than understanding reactions and try to find the interrelationships of the factors that cause these chemical reactions to occur. Educators should guide students actively building relationships between the concepts of Cell Biology and their relationship to daily life, for example for health problems [9]. In terms of the discussion of understanding, mastery, why and how the processes that occur in Cell Biology requires the ability to think processes, including critical thinking skills.

The problems found in the learning process need to be addressed immediately so as to achieve maximum results in the form of critical thinking stimulated students. The quality of learning of Cell Biology courses needs to be improved, one of the ways taken is to carry out lesson study. This lesson study was conducted in the even semester of 2018/2019 academic year.

2. Methods

The used research approach in this study is a qualitative-descriptive based on contextual or conditions that exist in real situations. The subjects of the study were students of Biology Education Study Program FKIP University of Muhammadiyah Bengkulu 2018/2019 Academic Year. The data in this study include the implementation of lesson study, the ability to manage classes, and the level of critical thinking among the students. This research was carried out for 4 cycles (plan, do and see) which was observed by 6 observers. The research used sheet of observation during lesson study implementation, assessment sheets for the ability to manage classrooms, and cognitive test questions for students' critical thinking skills. The research was conducted in March-July 2019 in the Biology Education Study Program, Faculty of Teacher Training and Education, University of Muhammadiyah Bengkulu. Data were collected through observation, interview and direct observation techniques. The data collected was then analyzed descriptively.

3. Results and discussion

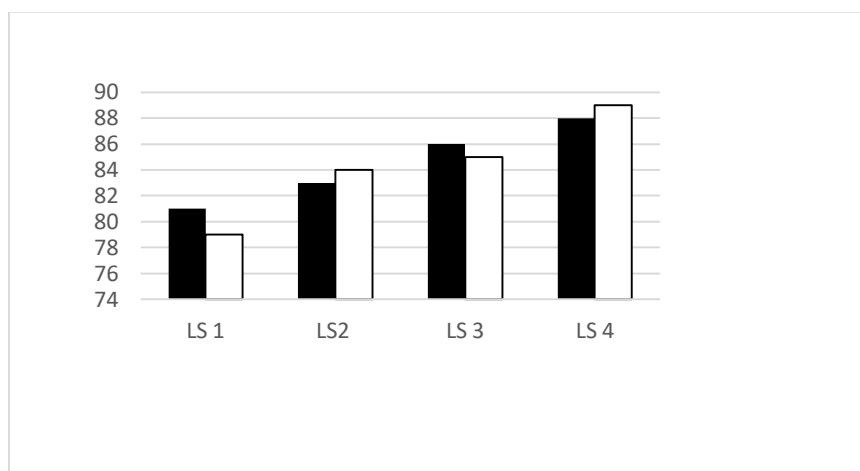


Figure 1. *Improvement on students' critical thinking skills through lesson study; LS1=cycle 1, and so on ; solid bar=critical thinking; empty bar=concept understanding.*

The implementation of the planning stage (plan) shows that the indicators for the implementation of the plan stage have been implemented by the lesson study team in planning learning with classroom management. Learning planning is designed to suppress how to teach students through classroom management conducted by model lecturers in class so that students can achieve the expected learning goals that have been designed. The lesson study team discusses the role of the model lecturer in managing student learning, namely arranging group divisions, providing guidance to students who have difficulty learning in class, motivating students, conditioning effective classroom conditions for learning, organizing time for each student learning activity, and give an evaluation.

The implementation of the do phase has increased from LS I to LS IV, but the implementation is not always 100% at each meeting due to time constraints due to some disturbances in class. In the next meeting, the model lecturer and the lesson study team have corrected the deficiencies that have occurred in learning so that the delay of students on this day will not be repeated in the next meeting. The increase in the do phase of lesson study activities in this study was due to efforts to improve the quality of learning at the end of each implementation for the next meeting. Improvement of learning based on deficiencies derived from observing activities during the learning process so that observers can exchange information about student activities and can learn from the experiences that are currently [10].

The increase in the stage of see lesson study activities by the model lecturers in the study was due to the lesson study being able to create openness of the model teacher to accept suggestions and criticisms given by observers for the realization of better learning [3].

Based on the description above it is known that lesson study can stimulate students' critical thinking in the Cell Biology course. Lesson study can be used by lecturers in lectures to become professional lecturers. Lesson study can improve the professionalism of educators (teachers and lecturers) because with lesson study educators conduct curriculum assessments, formulate learning goals, determine appropriate learning methods, and determine media [11].

4. Conclusion

Based on this study, it can be concluded that the implementation of lesson study has increased the level of critical thinking and concept understanding among the students. The ability to manage classrooms by the teacher model student in the biology education study program through the implementation of lesson study is well categorized. Through the implementation of lesson studies can stimulate students' critical thinking skills categorized as good.

Acknowledgments

Acknowledgments to all those who have assisted in conducting this research. I want to say thank you for Director Post Graduate Biology Education Dr. Irwandi, M. Pd for guidance and advice so that I can finish this research and article. The authors also thanked to the Post Graduate Biology Education who has funded this preliminary research.

References

- [1] Sriyati S 2005 *Reformasi Sekolah Melalui Lesson Study* (Bandung: Upiedu)
- [2] Hendayana S 2007 *Lesson study suatu strategi untuk meningkatkan keprofesionalan pendidik (Pengalaman IMSTEP-JICA)* (Bandung: UPI Press)
- [3] Widodo A 2008 Lesson study in Indonesia Introspect and prospect *Proceeding of the International Conference on Lesson Study*
- [4] Wahyuni S 2013 Optimalisasi Pembelajaran melalui Pelaksanaan Lesson Study *J Pendidikan Al muslim*
- [5] Zohar 1994 *High Order Thinking Skills (HOTS)* (Jakarta)
- [6] Griffin 2012 *Critical Thinking Skilss* [online] Retrieved from: <http://www.uwlax.edu/sotl/lsp/index2.htm>
- [7] Lukitasari M and Herawati S 2014 *The Improvement of Students Ability to Learn Cell Biology and Discuss Its Application In Live Through The Implementation Of The Student Team Achievement Divisions (STAD) With Lesson Study (LS)*
- [8] Saptono S 2015 *Pengembangan program integrasi atribut asesmen formatif dalam perkuliahan Biologi Sel (IAAF-BS) untuk meningkatkan kemampuan penalaran dan berpikir analitik* (Bandung: Sekolah Pascasarjana UPI)
- [9] Shupnik M A 1999 *Introduction to Molecular Biology* In Fauser B C J M Rutherford A.J Strauss III J F and Van Steirteghem A (eds) *Molecular Biology in Reproductive Medicine* (The Parthenon Publishing Group)
- [10] Mulyana S 2007 *Lesson Study paper* (Kuningan: LPMP Jawa Barat)
- [11] Lewis C 2004 *Does Lesson Study Have a Future in the United States* [Online] Retrieved from: http://www.sowi-online.de/journal/2004-1/lesson_lewis.htm