



Training Students' Attitudes in Environmental Science Course Through Lesson Study

Melatih Sikap Mahasiswa Pada Mata Kuliah Ilmu Lingkungan Melalui Lesson Study

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History Article

Received: 11 Desember 2018
Approved: 11 Januari 2019
Published: Maret 2019

Key Words:

Lesson study, Environmental Science, environmental awareness

Kata Kunci:

Lesson study, ilmu lingkungan, kesadaran lingkungan

Abstract

The core competences of Environmental Sciences are to communicate and to understand the concepts of natural resources and environment, to solve related problems, and to have an environmental awareness. An effective effort is needed to train the environmental awareness. The purposes of this research were to evaluate how to train the attitudes of biology education study program students in the second semester who were taking the environment knowledge lecture. This research was quantitative and qualitative interpretation research by observing the learning process of Biology education students through lesson study. The research stages consisted of plan, do, and see in two cycles. The collected data included the results of observation on the learning process by the observer, the lecturers' assessment related to the skills and attitudes during the learning process, and the students' self-assessment on their attitudes. The data were analyzed descriptively. The research revealed that the students learned actively, they cooperated within groups, the class cleanliness was an indicator of attitude to environmental awareness because the lecturers always reminded the students related to the indicators of keeping the environment clean and treating garbage, the learning resources used challenged the students to work and discuss. The students' attitudes towards environmental awareness are categorized as good-very good, the results of the lecturers' assessment of the attitudes are categorized as good, and results of the students' presentation skills are categorized as good-very good.

Abstrak

Kompetensi inti mata kuliah Ilmu Lingkungan adalah untuk berkomunikasi dan memahami konsep sumber daya alam dan lingkungan, untuk memecahkan masalah terkait, dan memiliki kesadaran lingkungan. Diperlukan upaya yang efektif untuk melatih kesadaran lingkungan. Tujuan penelitian ini adalah untuk mengevaluasi bagaimana cara melatih sikap kepada mahasiswa program studi pendidikan biologi pada semester II yang mengambil kuliah ilmu lingkungan. Penelitian ini adalah penelitian interpretasi kuantitatif dan kualitatif dengan mengamati proses pembelajaran siswa pendidikan Biologi melalui lesson study. Tahapan penelitian terdiri atas Plan, Do, See dalam dua siklus. Data yang dikumpulkan meliputi hasil pengamatan proses pembelajaran oleh pengamat, penilaian dosen terkait dengan keterampilan dan sikap selama proses pembelajaran, dan penilaian diri mahasiswa pada sikap mereka. Data dianalisis secara deskriptif. Hasil penelitian ini menunjukkan bahwa siswa belajar secara aktif, mereka bekerja sama dalam kelompok, kebersihan kelas adalah indikator sikap terhadap kesadaran lingkungan karena dosen selalu mengingatkan mahasiswa terkait dengan indikator menjaga lingkungan bersih dan penanganan sampah, sumber belajar yang digunakan menantang para mahasiswa untuk bekerja dan berdiskusi. Sikap mahasiswa terhadap kesadaran lingkungan dikategorikan baik-sangat baik, hasil penilaian dosen terhadap sikap dikategorikan baik, dan hasil keterampilan presentasi mahasiswa dikategorikan baik-sangat baik.

How to cite: Rachmadiarti, F., Kuntjoro, S & Budijastuti, W. (2019). Training Students' Attitudes in Environment Science Lecture Through Lesson Study. *Jurnal Riset Biologi dan Aplikasinya*. 1 (1): 40-46

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e-ISSN: 2655-9927

INTRODUCTION

Environmental science is a mandatory course in the second semester for the students majoring in biology, including biology study program. Environmental science has three credit semesters. The learning process of environmental science lecture was carried out in face to face theory, tutorial, and practicum. In this lecture, the core competence to be achieved is to communicate and to understand the concepts of natural resources and environment, to solve related problems, and to have an environmental awareness. So far, it is more focused on the learning which directs the students to develop concepts and to train skills, while the environment awareness has not been much trained. Thus, environmental awareness has not become a culture. Although the focus of this research was on how to train environmental awareness attitude, the students were also taught about the concept/knowledge and skills as capital in attitude.

Knowledge is the initial capital that an individual should have. The development of individual knowledge can be used to connect facts or information from various sources and draw conclusions (Kerby & Romine, 2009). By applying this knowledge and skills, an individual will be able to take actions to solve environmental problems and to have an attitude from that action, for example, the environmental awareness attitude. Presentation skills that are part of communicating which are trained in this research as belief or action. It means that the students who are given the opportunity to do presentation will become confident and will have an important role in learning. Therefore, in learning, the three aspects related to knowledge, concepts, and attitudes are the parts that need to be taught and trained comprehensively. The attitude which was trained in this research was the environmental awareness attitude, which means the attitude and actions that prevent environmental damages and the efforts to improve the environment quality (Kemendiknas, 2010; Kresnawati, 2013). The action to protect and manage the environment as an expression of love for the environment (Aini, 2008).

Based on above mentioned the problem identification, it was known that the effective competence (attitude) has not been continuously trained, therefore, this lecture needs to train students' attitudes to support their environmental awareness competence. The purpose of this research was to evaluate how to train the attitudes of biology education study program students in the second semester who were programming the environmental

science course. These purposes were to explore the learning process of the environmental science course, to train the attitudes related to the environmental awareness in addition to training concepts and skills, as well as to describe the results of the attitude assessment during the learning. To achieve the objectives of the research, this research was conducted through lesson study with the aim of developing the students' environmental awareness through learning community, especially the establishment of the interaction between students and environment, in addition to develop the interaction between students and students, and between students and teachers (Rachmadiarti and Fitrihidajati, 2017). While Lewis et al. (2006) suggested that the cycle of a lesson study starts with the teachers (lecturers) work by establishing the main objectives during the implementation of the lesson plan.

MATERIALS AND METHODS

This research was conducted to investigate the interaction between students and the environment, between students and students, and between students and lecturers. The implementation of the learning was carried out through lesson study, namely the lesson plan was made together with the ecology team, and the learning in the class involved another team as an observer.

This research was conducted in the class of Biology Education 2014. The lecturers who participated in developing the lesson plan consisted of three lecturers of ecology subjects. While the lecturers who participated in the observation of learning and reflection of learning consisted of two lecturers from ecology team, three lecturers from other courses and one guest lecturer, along with two lecturers from other courses.

The learning activity was carried out for two meetings with each meeting consisting of two learning period and two reflections. The findings of lesson study were divided into two stages, there were: stage 1 consisted of plan 1, do-see 1, reflection 1 and stage 2 consisted of plan 2, do-see 2 reflection 2. At the do-see stage, the learning process was carried out, during the learning process, an observation was carried out. The results of observations including the student activities and learning processes were recorded by the observers, including the students' work and the students' ability to present the results of the discussion. After the learning process, the assessment was conducted. The assessment was conducted to assess the presentation skills and self-assessment for the environmental awareness attitude.

The data collected included: 1) the results of the observation on student activity and learning processes that occurred during the learning process, including problems and solutions to the problems; 2) the assessment of presentation after the learning process, and 3) self-assessment related to the environmental awareness attitude. observation to the learning students and reflection note during the lesson. Observations were measured by looking at the number of observation results, comments and solutions during and after the learning process; The Data were analyzed descriptively.

This research began with the stage of the plan, where lectures and team developed lesson plans. They developed two lesson plans for two 100-minutes meetings. The feedbacks on the lesson plan from the lecturers from other teams were summarized as follows. (1) The lesson plans needed to be clarified in the lesson plan the connection between the environmental issues and the topics to be studied, namely the growth of population. (2) The word “audience” in the basic competencies needs to be eliminated, “audience” is written in the learning objectives. (3) The indicator of communicating in the lesson plan was clarified as presenting the results as one of the skills to be assessed. (4) The point of summarizing the lessons, which would be conducted by the students and the lecturers, should underline

the focus materials. (5) The indicator of presentation should be made in order that the students can implement the presentation according to the expectation in basic competence. (6) A non-formal observation of environmental awareness attitude is needed on the eco-campus activities.

A good plan is very useful in improving the lesson plan that will be implemented in the learning because there is some feedback to improve the learning, namely the delivery of presentation indicators on the students and make non-formal observations on students while doing environmental awareness activities. This presentation is important because, through a presentation, the students’ understanding of the learning material can be quickly identified. The next stage is the do and see. At this stage learning and observation of learning were conducted. The results of the learning observation are presented in Table 1 and 2.

Table 1a illustrates that the completeness of the implementation of the lesson plan was 100%. All the stages in the learning activities designed on the lesson plan had been implemented. The learning condition was also supported by the results of the observation of the learning, which is reflected in the see activity (Table 2).

Table 1. The completeness of the implementation of the lesson plans

Num.	Learning steps	Completeness	
		Meeting 1	Meeting 2
A. Opening			
Phase 1: Presenting the learning objectives and motivating students			
1	Reviewing the previous learning material on environmental issues (environmental issues, environmental pollution issues by questions and answers)	100%	100%
2	Displaying the slides of environmental pollution, human population, and asking students to observe and give comments on the	100%	100%
3	Stating the learning objectives (cognitive, psychomotor, affective), including environmental awareness attitude and cooperation.	100%	100%
B. Main (100 minutes)			
Phase 2: Presenting information			
1	Students pay attention to the lecturer presenting environmental pollution cases, human population growth and the affecting factors	100%	100%
Phase 3: Organizing students into study groups			
2	Students are instructed to sit in groups and to read the student worksheet (environmental pollution, changes in the survival rate of US pop) provided	100%	100%
Phase 4: Guiding group work and study			
3	Students read the worksheet carefully and ask questions about the things they do not understand while reading the student worksheet	100%	100%

Num.	Learning steps	Completeness	
		Meeting 1	Meeting 2
A. Opening			
4	The lecturer asks the students to do the student worksheet by discussion	100%	100%
5	The lecturer guides the discussion in working on the student worksheet	100%	100%
6	Phase 5: Presenting the results of the discussion The students and their groups present the results of the discussions classically guided by the lecturer	100%	100%
7	The students and the lecturer summarize the learning material related to lab work	100%	100%
8	Phase 6: Giving Reward Lecturer gives reward the group with the best performance	100%	100%
C. Closing			
1	The lecturer and the student summarize the learning materials on environmental pollution and population	100%	100%
2	The lecturer gives gives an assignment to study about the next material, which is environmental management	100%	100%

Table 2 shows that students studied actively. Listened and paid attention to the lecturer, did the student worksheet. Having discussions and doing presentations, although some students were not concentrated at the beginning of the class. Students learned in groups with the worksheet written in English as the learning resources, the students were confident in doing presentations in English. In addition, the students could work with their friends in one group and show an environmental awareness attitude, which was indicated with the clean classroom. Such a condition is supported by a model lecturer who frequently visited and guided each group, by asking the difficulties they experienced. In addition, the lecturer had good English-Speaking

competence. To monitor the students' environmental awareness and cooperation, the students did self-assessment (Table 3).

An evaluation was carried out at the end of the learning by asking each group to do presentations, and the results of the assessment are presented in Table 4. The students who had conducted self-assessment related to collaboration and presentation assessment by lecturers were also observed related to student activities during learning and the results were in line with the two things (Table 5). Table 5 shows that students were active in learning, group work, applying scientific attitudes, and direct involvement in presentations.

Table 2. Summary of the observation results

Num.	Observer	The results of observation
1	1	Students discussed and corrected mistakes with presentations Students listened to the topic and did the work Students listens, and pay attention to pictures (phase 1) Students listen and pay attention to Power Point Presentation When summarizing, the students should not stand, but sit still in their seat.
2	2	Group 1,2, 3 (still working on their own work when one of the other groups sstep forward). The lecturer should make sure the group work has finished. One student, when the lecturer explained the material, was not concentrated. Lecturers needed to remind the students who were busy working on their own.
3	3	Some of the students were not yet concentrated at the begining of the class. After given the student worksheet, the students became more active in discussions and did the student worksheet Because there was not a clear time limitation for finishing the worksheet, the lecturer should have provided the allocation time for finishing the worksheet and discussion
4	4	Always gave questions and slides

Num.	Observer	The results of observation
5	5	Group discussion Motivated, guided and asked about the difficulties that the students experienced Often visiting student groups and often having discussions with them, so that it encouraged the passive students to become more active Visiting each group, and checking their progress on the task Reminding about environmental awareness and cooperation Spook english fluently and well. Motivated to learn in English. The availability of the worksheet eased the students and teachers in learning. Working in groups, good language, confident. Clean class.

Table 3. Self assessment of attitude

Num.	Assessed aspects	Assessment Percentage			
		K	C	B	SB
1	Cooperation			22%	78%
2	Environment awareness				
	a. Keep the environment cleanliness			22%	78%
	b. Treat rubbish			28%	72%

Note:

Assessment rubric

Num.	Assessed aspect	Assessment			
		K	C	B	SB
a.	Keep the environment cleanliness	The surroundings of the students are not clean	The surroundings of the students are not clean, still often reminded by teachers	The surroundings of the students are always clean, still need to be reminded by the teacher	The surroundings of the students are always neat and clean, done independently
b.	Treat rubbish	Do not put rubbish on the rubbish bin	Rarely put rubbish in the rubbish bin	Always put the rubbish in the rubbish bin, but not in accordance with its type	Always put the rubbish in the rubbish bin according to its type

Table 4. Presentation assessment

Num.	Assessed aspects	Group / Score					
		1	2	3	4	5	6
1	Mastery of the science concepts delivered	3	3	3	3	4	4
2	Presenter performance	4	3	3	3	4	4
3	Presentation display	4	4	3	3	4	4
	Average	3.66	3.33	3	3	4	4

Note:

Assessment rubric

Num.	Assessed aspects	Score			
		1	2	3	4
1	Mastery of the science concepts delivered	Not mastering the concept of population very well, the terms used are not correct	Lack of mastering the concept of population, the terms used are less precise	Mastering the concept of population well, the terms used are correct	Mastering the concept of population very well, the terms used are correct and precise

Num.	Assessed aspects	Score			
		1	2	3	4
2	Performance	The delivery is not easy to understand, not communicative with the audience, not give the audience an opportunity to think	The delivery is not easy to understand, less communicative with the audience, giving less opportunity for the audience to think	Delivery is easy to understand, communicative with the audience, giving less opportunity for the audience to think	Delivery is easy to understand, very communicative with the audience, giving the audience an opportunity to think
3	Presentation display	The displays are unattractive and not suitable with the material	The displays are less attractive and less suitable with the material	The display look attractive but less suitable with the material	The displays are very attractive and suitable with the material

Table 5. Results of student activity observation

Num.	Aspect of Assessment	Assessment criteria	Group					
			1	2	3	4	5	6
1.	Activeness in learning	1. Students are active, earnest and do not show any irrelevant behavior 2. Students only show the two behaviors mentioned above 3. 1. Students show less than the above two behaviors	3	3	3	3	3	3
2	Group work	1. Students are active, discussing with their group members, not dominating and respecting others' opinions 2. Students only show the two behaviors mentioned above 3. Students show less than the above two behaviors	3	3	3	3	3	3
3	Application of scientific attitude	1. Students are thorough, honest and responsible during the observation activities 2. Students only show the two behaviors mentioned above 3. Students show less than the above two behaviors	3	3	3	3	3	3
4	Involvement during presentation	1. Students dare to express opinions, appreciate others' opinions and pay attention to the presentation activities 2. Students only show the two behaviors mentioned above 3. Students show less than the above two behaviors	3	3	3	3	3	3
Scores gained			3	3	3	3	3	3

The lesson plan, which was developed by the collaboration of teaching team and the lecturers were present plan can be implemented step by step in accordance with the syntax of cooperative learning (Ibrahim et al., 2000). The most important thing from the implementation of this lesson plan was a good collaboration in the teaching team and among the

lecturers who were present in the plan activities. This is in accordance with the stages of the lesson study cycle (Hendayana *et al.*, 2007; Suratno and Cock, 2009). At this lesson plan stage, the lecturers with their knowledge work together to construct lesson plans to determine the best learning for students, discuss student tasks, and the opportunity to discuss

in detail how students think and how best to further the understanding of student thinking (Fernández, 2010).

In this study, the student's academic ability was evaluated based on the communication skills, namely from the ability to present in groups. From the presentation, it can be seen, in addition to communication skills as well as mastery of concepts from the material presented, for example in population materials other than students are able to present material/concepts/implementations from presenter performance and presentation display indicators, namely describing the population and the influencing factors including impacts population in the environment, one of which causes environmental pollution, students also understand the concepts presented from the evidence of one of the presentation assessment scores, namely the mastery of the science concepts delivered. The success in terms of concepts and student communication is also inseparable from student interaction with students both in groups while working on and discussing the lesson provided in the worksheet, interactions between groups during presentations (Rachmadiarti and Fitrihidajati, 2017).

The development and success of students have emerged in the learning of environmental knowledge courses, namely academic abilities and attitudes during learning, namely concern for the environment. This is because the development and success of lecturers and the team have acted as a good facilitator. This can occur because the knowledge of co-construction in the lecturer team causes learning to be better for students (Siu, 2007). In addition, with joint planning, lecturers also make it possible to expansive learning (Engestrom, 2001), where students learn something that has not previously been studied and is involved in constructing and implementing (Engestrom and Sanino, 2010). This condition can encourage the students to succeed in learning and acting (environmental care attitude).

CONCLUSION

Based on the results, which showed that the students' attitudes towards environmental awareness were categorized as good-very good, the results of the lecturers' assessment of attitudes was good, and the results of students' presentations skills were categorized as good-very good. It can be concluded that learning through lesson study in the environmental science course can train the students' attitude.

REFERENCES

- Engeström, Y. (2001) Expansive Learning at Work: Toward an activity theoretical reconceptualization, *Journal of Education and Work*.14 (1) : 133-156,
- Engeström, Y. and Sannino, A. (2010). Studies of Expansive Learning: Foundations, Findings and Future Challenges. *Educational Research Review*. (5): 1-24.
- Fernández, M. L. (2010). Investigating and how projective teachers learn through microteaching lesson study. *Teacher and teaching education*. 26 (1): 351-262.
- Hendayana, S. Supriatna, A. Imansya, H. (2007). Indonesia's issues and challenges on quality improvement of mathematics and science education. *Journal of International Cooperation in Education*. 4 (2), 41-51
- Kemendikbud. (2016). Peraturan Menteri Pendidikan Dan Kebudayaan Republik Indonesia Nomor 23 Tahun 2016 Tentang Standar Penilaian Pendidikan.
- Kerby, D & Romine, J. (2009). Develop Oral Presentation Skills through Accounting Curriculum Design and Course-Embedded Assesment. *Journal of Education for Bussiness*. 85 (3): 172-179.
- Kresnawati, N. (2013). Korelasi Kualitas Pembelajaran Geografi dan Hasil Belajar Terhadap Sikap Peduli Lingkungan Siswa Kelas XII IPS SMAN 1 Ponorogo. *Jurnal Pendidikan Biologi*. 1 (3): 298-303.
- Lewis, C., Perry, R., Murrata A. (2006). How should research contribute to instructional improvement? *The case of lesson study. Educational researcher*. 35 (3): 3-6.
- Ibrahim, M., Rachmadiarti, F., Ismono, Nur, M. (2000). Kooperatif Learning. Surabaya: Unesa Press.
- Rachmadiarti, F. and Fitrihidajati, H. (2017). Training Principal of Lesson Study at Lecture of Learnig Materials Development. Proceeding ICLS 2017. Lombok Timur: Universitas Hamzanwahdi.ISBN: 978-602-98097-8-7.
- Suratno, T. & Cock, K. J. (2009). A school-university partnership in Indonesia. Lessons learnt from lesson study. In: Lim, C. P., Cock, K., Lock, G. & Brook, C. (Eds.). Innovative practices in pre-service teacher education: An Asia-Pacific perspective. Rotterdam: Sense Publisher.
- So, W.M.W. & Kong, S.C. (2007). Approaches of inquiry learning with multimedia resources in primary classrooms. *Journal of Computers in Mathematics and Science Teaching*, 26(4), 329-354. Waynesville, NC USA: Association for the Advancement of Computing in Education (AACE).