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Practicing 21st Century Skills for SMPN 1 Aikmel Students Through a Scientific Approach with a Lesson Study Model

Marhamah [a,1]*, Maimunah [b], Khalikul Amin [b], Misnawati [b]

[a] Biology education, Faculty of Mathematics and Natural Sciences, East Lombok-Indonesia
[b] SMPN 1 Aikme, East Lombok-Indonesia
[1] Email: mansaniki@gmail.com
* Corresponding author: mansaniki@gmail.com

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ABSTRACT

The purpose of this study was to train 21st century skills for SMPN 1 Aikmel students through a scientific approach with a Lesson Study model. The research method used is descriptive qualitative, which examines the process of learning science divided into several cycles to reveal the facts of learning. The subjects in this study were class VII students of SMPN 1 Aikmel. Lesson Study was carried out in two cycles, each cycle consisting of the stages of Plan (composing Lesson design), Do (open class), See (learning reflection), Redesign Lesson design, Do (open class), and See (learning reflection). Based on the results of observations that have been made, it was obtained data on student collaboration skills of 75.1%, critical thinking skills of 72.4%, and literacy skills of 72.5%. From the data it can be concluded that overall collaboration skills, critical thinking skills and literacy skills are in the high category. The results of the study showed that there were changes in students' collaboration skills, literacy skills and critical thinking skills because they were trained through a scientific approach in each cycle of the science learning process that was carried out.

Keywords: 21st century skills, scientific approach, lesson study

Introduction

Education has an important role in influencing a person's life in all aspects, therefore education must really be prepared to equip students to face the challenges of life in the future. This is in line with the objectives of the 2013 curriculum, which is to prepare Indonesian people to have the ability to live as individuals and loyal citizens productive, creative, innovative and affective and capable to contribute to the life of society, nation, state and world civilization. Science is one of the important subjects in school. Science empowers students to have organized knowledge, ideas, and concepts about the natural surroundings. This knowledge is obtained through a series of experiences and scientific processes.

Science learning process at the junior high school level needs to be conducted through a scientific approach. According to (Nugroho, 2014) a scientific approach is a mechanism for obtaining knowledge with procedures based on a scientific method, prioritizing inductive reasoning looking at specific phenomena or situations and drawing general conclusions. Observation and experimentation are needed in the learning process to collect data and information which is then formulated and tested hypotheses. According to (Susilana & Ihsan, 2014), activities in the scientific approach include: (1) Observing, is the process of observing a fact, (2) Questioning, is the process of asking or making hypotheses about the facts observed, (3) Associating, which is the process of reasoning or connecting what is known previously with what is just known, (4) Experimenting, is the process of testing questions or hypotheses that are raised, (5) Processing, which is the process of formulating or concluding knowledge obtained from the four previous processes, (6) Conclusing, is the process of formulating or concluding knowledge obtained, and (7) Presenting, is the process of presenting knowledge.

Several processes in the scientific approach can train 21st century skills such as critical thinking skills, collaboration skills and literacy skills. According to the National Education Association, 21st century skills include 4C, namely communication, collaboration, critical thinking, and creativity. Communication skills are the skills to express thoughts, ideas, knowledge, or new information both orally and in writing, collaboration skills are the ability to exchange thoughts or ideas between students. The ability to collaborate can also be interpreted as the ability to work effectively and respect different team members, the ability to show flexibility and the desire to be useful in making compromises to achieve goals, the ability to assume responsibility in collaborative work and value the contribution of each member. Critical thinking skills are the ability to keep all information in a logical and accountable measure. Critical thinking is a process that enables students to acquire new knowledge through problem solving and collaboration which includes activities of analyzing, synthesizing, making judgments, creating, and applying new knowledge to real world situations (Ennis, R., 1991). Creativity skills are the ability to find new things that have not existed before, are original, develop new solutions for each problem, and involve the ability to generate new ideas.

Of course, 21st century skills cannot be possessed by someone alone but need to be trained through a process of learning and experience. The learning process that is carried out should provide learning opportunities for students to acquire these skills, one of which is through a scientific approach implemented with the Lesson study model. Lesson study stages consist of Plan (planning), which is a team that is involved together in designing the learning process which is carried out so that students are really actively involved in the learning process and gain meaningful learning experiences (Marhamah, 2017). The Do stage (open class), namely the implementation of the learning process observed by the team involved in Lesson study activities, and the See stage (learning reflection), which is the stage of reflecting on the learning outcomes that have been carried out based on the results of learning observations.

Methods

The method used in this study is descriptive qualitative, which describes the results of learning studies (lesson studies) in science subjects at SMPN 1 Aikmel. The research subjects were class VII students of SMPN 1 Aikmel. The Lesson Study was carried out by researchers with a team of partner teachers at SMPN 1 Aikmel consisting of four people. Lesson study was carried out in two cycles, each cycle consisting of the Plan, Do, See, Redesign Plan, Do, and See stages as shown in Figure 1.

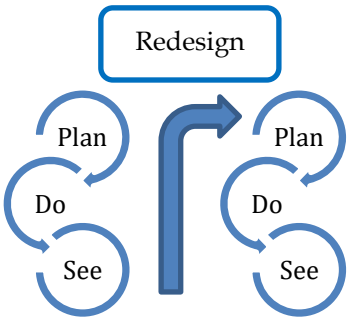

Figure 1. Lesson study cycle

The research lesson in this study is to train 21st century skills which include collaboration skills, literacy skills, and critical thinking skills. Indicators of collaboration skills used include: (a) positive interdependence (working on the basis of assignments), (b) face-to-face interaction (not separating from friends), (c) Accountability and individual personal responsibility (shared responsibility on task completion, (d) communication skills (discussing with group mates and asking friends if they don't understand), (e) group work skills (participating in completing tasks) in student worksheet, (b) using books as a source of information, (c) using video as a source of information, (d) communicating the results of the experiment. The indicators for critical thinking skills used include: (a) Focus, understanding the problem given, (b) Reason, giving reasons based on facts in making conclusions, (c) inference, choosing the right reason to support conclusions, (d) Situation, me using information that is appropriate to the problem, (e) Clarity, using further explanation about the purpose of the conclusion. The instrument used to measure these three skills is an observation sheet. Data analysis was carried out based on the results of observations and reflections on learning with the team involved in each cycle.

Results and Discussion

Lesson study is carried out in two cycles on science subjects, each cycle consisting of Plan, Do, and See, redesign (Plan), Do, and See. The implementation of Lesson Study in science lessons can be seen in Table 1.

Science learning process with a scientific approach wich was conducted with Lesson study pattern provides learning experiences to students. When discussing laboratory equipment and rules, the students observe laboratory device search information about the function of the devices. Students made a collaboration and how the job description in laboratory. In measurement lesson, the students were involved to do measureent activity of the objects around to find concept about unit of measurement. Several measurements done by students were measuring the length of the table and temperature measurement by using standard and non-standard unit like in picture 2. Based on observations on the learning process which has been done, it was gained that the result of skills in 21st century like in Table 2.

Table 1. Implementation of Lesson Study in Science Lessons at SMPN 1 Aikmel

Cycle	Stages of Lesson Study	Material	Class	The team involved
1	Plan, Do, See	Laboratory equipment and laboratory rules	VII 9	Model teachers, lecturers, observers
	Redesign Plan, Do, See	Laboratory equipment and laboratory rules	VII 6	Model teachers, lecturers, observers
2	Plan, Do, See	Measurement	VII 6	Model teachers, lecturers, observers
	Redesign Plan, Do, See	Measurement	VII 3	Model teachers, lecturers, observers

Table 2. Results of 21st Century Skills in Science lessons for Students of SMPN 1 Aikmel

21st century skills	Percentage	Category
Collaboration skills	75,1 %	High
Literacy skills	72,5 %	High
Critical thinking skills	72,4 %	High

Based on the percentage of results of collaboration skills, it is known that they are in the high category, this is due to the learning process of students and their group friends discussing in completing assignments on the given student worksheet. At first some students worked individually in groups, smart students did not support their friends who could not, communication between students in groups was lacking. The learning facts were used as material for improvement in the next cycle by reminding students to help each other in doing the assignments given by the teacher. Students' literacy skills and critical thinking skills are in the high category after improving the learning process, which was previously low. The low literacy skills at the beginning of learning are shown by some students who do not understand the meaning of the student worksheet, do not read the instructions in the sudent worksheet and do not use teaching materials properly. Reflection activities that are carried out together after each completion of the learning process aim to improve the process of implementing learning in the next cycle. (Cicek & Tok, 2014) (Marhamah, 2017). Through Lesson Study activities the quality of learning can be improved in each cycle (Lewis & Perry, 2017).

Figure 2. Collaboration process on laboratory equipment material (a) conducting experiments on measurement material (b)

Improving collaboration skills, literacy skills and critical thinking skills in science learning with the application of a scientific approach through Lesson study because at the learning stage students are trained to carry out observation activities, conducting experiments and

make group presentations. These activities will trigger the creation of student learning experiences by using all of their five senses so as to help develop their various potentials (Susilana & Ihsan, 2014). According to Thordike (Dahar, 1996) practical activities will strengthen the learning process. Practice will strengthen the connection between stimulus and response. The presentation of the results of the discussion carried out by students will provide student learning experiences. In this activity students will get feedback from the teacher, this will have a positive impact on students on their learning experience.

Conclusion

Based on the results of the research and discussion, it was concluded that science learning with a scientific approach trains students in observing activities, conducting experiments, and communicating the results of observations through presentation activities in which they are carried out cooperatively so as to improve collaboration skills, literacy skills, and students' critical thinking skills.

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