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The Effect of Guided Inquiry Learning Model Through the Utilization of School Environment Towards Students' Scientific Literacy on Biodiversity Concepts

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Abstract

This research aimed to observe the effect of guided inquiry learning model through the utilization of school environment toward student scientific literacy on biodiversity concepts. This research was a quasi-experimental research that using randomized control group, pretest-posttest design. The sampling technique used in this research was simple random sampling at one high school i Serag City, Indonesia with class X MIPA 5 as an experiment class and class X MIPA 4 as control class. The result of the scientific literacy was analyzed used t test on significant level $\alpha = 0,05$, significance value result was $(0,000) < 0,05$ H_0 rejected for competence science and significance value result was $(0,004) < 0,05$ H_0 rejected for attitude science. Therefore it can be conclude that there was effect of guided inquiry learning model through the utilization of school enviroment towards students' scientific literacy on biodiversity concepts.

Keywords: Guided Inquiry, Scientific Literacy, Biodiversity.

INTRODUCTION

Entering the 21st century, the increasingly rapid development of knowledge and technology requires humans to adapt in all aspects of life, one of which is the aspect of education. Education is expected to improve the quality of human resources in carrying out their lives in the midst of various effects of globalization (Betari et al., 2016). Science learning is part of education that plays a role in improving the quality of education. In science learning, students are expected to have a thorough understanding to solve problems in everyday life (Puspitasari, 2015). In dealing with problems, students are required to have the ability to identify problems and make decisions about these problems. One of the skills that must be possessed is scientific literacy. Scientific literacy is the ability of students to master and learn science and science in the learning process. It is very important for students to master scientific literacy so that they can understand the problems that will be faced by modern society which is very dependent on the development of science and technology (Kurnia et al., 2014).

The level of scientific literacy of Indonesian students is still relatively low, this is evident from the results of research on the assessment of science learning outcomes at the international level organized by the Organization for Economic Cooperation and

Development (OECD) on the Program for International Student Assessment (PISA) 2015, namely from 72 countries participants, Indonesian students are in 64th position with an average score of 403 from the international average score of 500. The results of these achievements indicate that the scientific literacy ability of Indonesian students is still in the lower group and is still relatively low compared to other countries (OECD, 2016). The low scientific literacy score of students in Indonesia is caused by several things, including the curriculum and education system, the selection of teaching methods and models by teachers, learning facilities and facilities, learning resources, teaching materials, and so on (Kurnia et al., 2014).). In practice, the use of learning methods or models tends to be teacher-centered (Puspitasari, 2015). This condition encourages the need for efforts to improve science learning in schools gradually and continuously.

Based on the results of interviews obtained from a biology teacher at a high school in Serang City, Indonesia which become a school in this study that the learning carried out is still learning-oriented which is dominated by teachers. Where the teacher only uses the lecture method in the learning process and the teacher never measures the scientific literacy ability of the students. The teacher should act as a facilitator who guides students to develop critical thinking skills, identify problems, create hypotheses, collect data, formulate and determine the best solution for the conditions of a problem. Based on this, an educator needs to establish a learning model that directs students to play an active role and explore the potential that exists in themselves. One of the learning models that involve the activeness of students to find their own concepts is the guided inquiry learning model. Learning using guided inquiry allows students to increase their creative capacity and responsibility in solving problems at hand. In line with this, scientific literacy skills will develop by themselves and will develop during the learning process.

Research related to the guided inquiry learning model has been carried out by several researchers including Pratika and Muchlis (2016) entitled "Application of Guided Inquiry Learning Models on Reaction Rate Materials to Practice Science Literacy Skills for Class XI Students of SMAN 1 Gondang Tulungagung" shows that the application of the learning model Guided inquiry can practice scientific literacy skills. This is because the guided inquiry learning model involves students with the objects they learn directly. a high school in Serang City, Indonesia which become a school in this study is an environment-based school, it is very unfortunate if it only uses the school environment as a source of learning only on the concept of the ecosystem. Whereas in biology learning there are many concepts or sub-concepts that

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can be applied in utilizing the school environment as a learning resource, one of which is the Biodiversity Level sub-concept.

Sub-concept of Biodiversity Level is one of the sub-concepts in biology learning that requires learning resources that can facilitate students to interact directly with their environment. Learning resources in the form of a school environment are expected to help students gain experience through direct observation so that students gain a deep understanding of the natural surroundings and students can solve the problems they face and apply them in everyday life. Based on the problems that have been described, the purpose of this study is to determine whether or not there is an effect of the guided inquiry learning model through the use of the school environment on students' scientific literacy skills on the sub-concept of the level of biodiversity.

METHOD

The method used in this research is a quasi-experimental method. The research design used was a randomized control group, pretest-posttest design.

RESULTS AND DISCUSSION

Students' scientific literacy was measured using 12 multiple-choice questions and 12 statement questionnaires. The scientific literacy test was given to students twice, namely before the learning process (Pretest) and after the learning process (Posttest). In this study, scientific literacy was measured, namely the aspects of science competence in Figure 1 and aspects of students' scientific attitudes in Figure 2.

Aspect of Science Competence

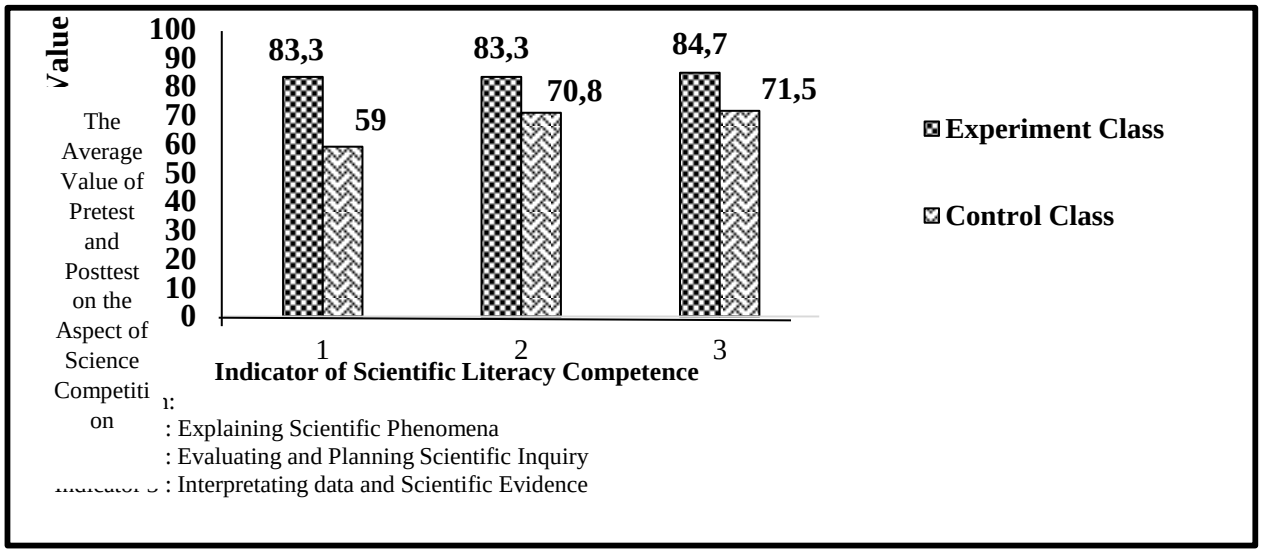


Figure 1. The average value of the pretest and posttest of aspects of students' scientific competence

Based on Figure 1, it can be seen that the average value of the posttest of students' scientific literacy in the aspect of science competence in the experimental class obtained

an average score of 83.8 in the good category. In the control class, the average score was 67.1 in the sufficient category. This is because the implementation of learning in the experimental class using guided inquiry learning provides opportunities for students to learn how to find facts, concepts and principles through direct experience. Based on the research results of Rakhmawan et al., (2015) that the inquiry learning process encourages students to develop their thinking skills. Through their thinking skills, students can build productive, analytical and critical attitudes and by thinking students will also get a meaningful learning experience. Through meaningful learning makes students understand and remember more about the information or lessons they have learned. Students' scientific literacy in the aspect of scientific competence is seen in addition to the average score on the pretest and posttest, it is also seen from the test results of each indicator on science competence. The Figure 2 is the test results for each indicator of science competence in the experimental and control classes.

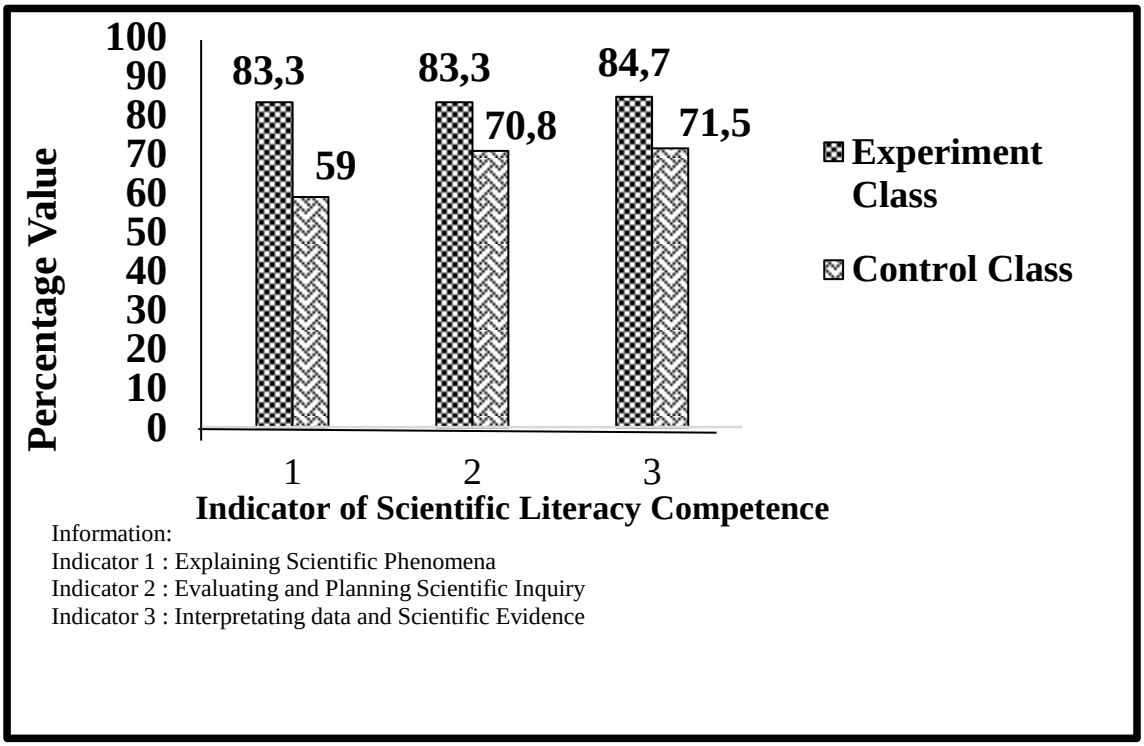
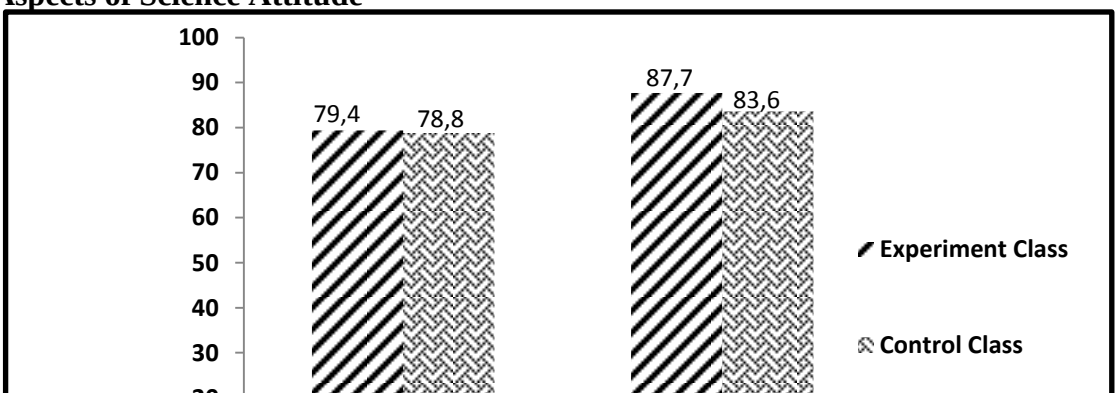


Figure 2 shows that the value of the posttest results of scientific literacy in the aspect of scientific competence there are differences in each indicator. The indicator that obtained the lowest average score in the experimental class was the indicator of explaining scientific phenomena, evaluating and designing scientific investigations with

the same percentage score of 83.3% in the good category. This is because at the stage of formulating problems that can hone students' abilities in explaining scientific phenomena, students experience difficulties in finding and determining problems. This happens because the problems presented are less specific which makes it difficult for students to identify, formulate, and determine temporary answers to the problems displayed. The low percentage value on the indicators of evaluating and designing scientific investigations is caused at the stage of collecting data that can hone students' abilities in evaluating and designing scientific investigations, students have difficulty evaluating problems that have been determined at the stage of formulating problems with facts or evidence found in the school environment, while data collection activities aim to evaluate and identify problem formulations and hypotheses that have been made previously by collecting facts or evidence through observation activities. In addition, the thing that causes the low value of evaluating and designing scientific investigations is that the teacher does not provide clear directions and instructions to students when data collection activities take place.

The highest average value of scientific literacy in the aspect of scientific competence in the experimental class is in the indicator of interpreting scientific data and evidence with a percentage score of 84.7% in the good category. This is because the ability to interpret data and scientific evidence of students in the experimental class has been honed. This happened because students in the experimental class carried out activities to analyze data from the results of data collection based on observations on plants and ecosystems carried out in the school environment. Students discuss with members of their respective groups to analyze the hypotheses that have been made previously are correct or not. In addition, students make conclusions based on the data they get before, process, and after making observations. In the activity of presenting the results, students use the information they have obtained when collecting data, as a result the information becomes meaningful. These activities are implemented in the stages of the guided inquiry learning model, namely the stage of collecting data and making conclusions.

Aspects of Science Attitude



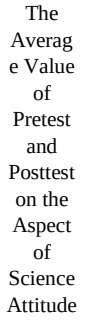


Figure 3. The average value of the pretest and posttest of students' science attitudes.

Based on Figure 3, it can be seen that the posttest average value of students' scientific literacy in the aspect of science attitudes in the experimental class obtained an average score of 87.7%, while the control class obtained a score of 83.6%. The average score in the two classes is included in the same category, namely in the very good category. This can happen because there are several factors that can effect the attitude of science in students including through repeated learning practices and the support from the environment such as classmates, school culture and family towards a person's attitude (Slameto, 2010). the science attitude of the experimental class students was higher than the control class. This is because in the experimental class the implementation of learning uses a guided inquiry learning model. According to Murningsih et al., (2016) states that the guided inquiry learning model provides opportunities for students to find concepts and information and provides flexibility for students to think critically and participate actively in class. Scientific literacy skills in the aspect of science attitudes begin to be grown when the teacher gives problems when starting learning. In addition, when the activity of collecting data by utilizing the school environment will make learning interesting. This is in line with the results of research by Nulhakim and Maulida (2015) which states that learning by utilizing the school environment as a learning resource will make activities in the learning process more interesting so that the material packaged in learning by utilizing the school environment becomes more attractive. Students' scientific literacy in the aspect of science attitudes is seen in addition to the average score on the pretest and posttest, it is also seen from the

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test results of each indicator on science attitudes. The following are the test results for each indicator of science attitudes in the experimental and control classes.

Based on Figure 4, it can be seen that the value of the posttest results of scientific literacy in the aspect of scientific attitude there are differences in each indicator. The indicator that obtained the lowest average score in the experimental class was the interest in science indicator with a percentage value of 85.2% in the very good category. This happens because at the stage of formulating problems that can lead to an attitude of interest in science, students have difficulty in finding problems because the presentation of the problems contained in the LKS is less specific, so students have difficulty in determining problems, while the purpose of giving problems is to create curiosity. know students to find information in solving problems (Hartati, Risa, 2016).

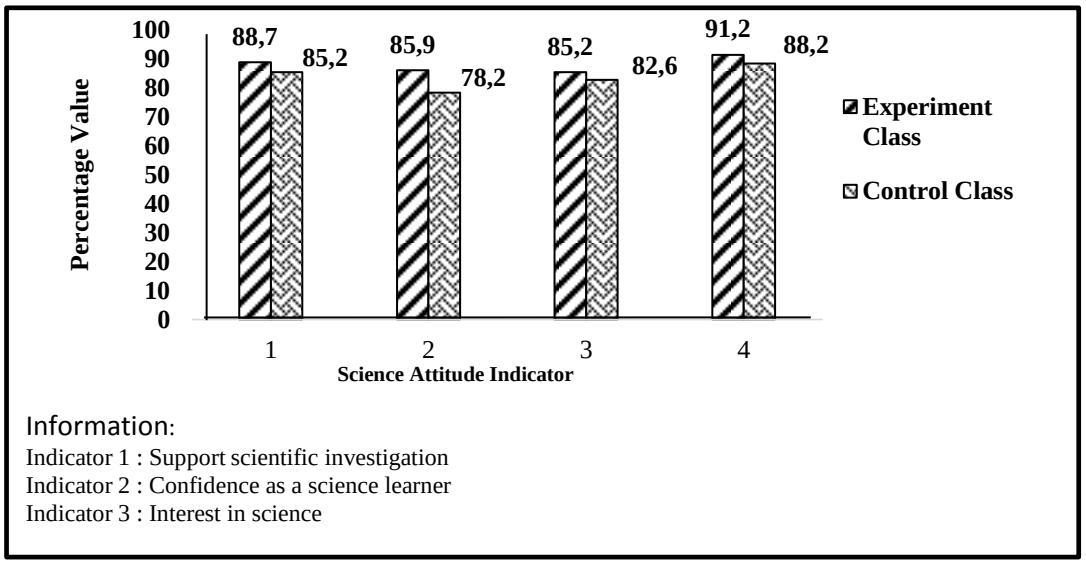

Figure 4 Science Attitude on Each Indicator.

The highest average value of scientific attitude in the experimental class is found in the indicator of responsibility for natural resources and the environment with a percentage score of 91.2% in the very good category. This happens because the attitude of responsibility towards natural resources and the environment arises when students make direct observations of the objects being observed, namely the plants and ecosystems that exist in the school environment. The learning process by applying the guided inquiry learning model makes students motivated to know more about the problems that occur, the causes of problems, and how to solve these problems on their

own initiative. This is what can foster awareness in students to have a caring attitude or responsibility towards natural resources and the environment (Ratnasari *et al*., 2015). This is implemented in the stages of the guided inquiry learning model at the stage of collecting data. In addition, the thing that causes the high percentage value for the indicator of responsibility for natural resources and the environment is possible because at the end of each learning process the teacher explains to students the importance of the material learned in everyday life. Like the importance of disposing of garbage in its place because if garbage is disposed of carelessly it will damage the existing ecosystem.

CONCLUSION

Based on the results of research that has been carried out, there is an effect of the guided inquiry learning model on students' scientific literacy skills by utilizing the school environment on the sub-concept of the level of biodiversity in class X in Senior High School Level with a significance level of 0.000 < 0.05 for science competence and 0.004 < 0, 05 for science attitude. The average value of scientific literacy skills in the aspect of scientific competence in the experimental class got a score of 83.3 and the control class got a score of 67.1. Meanwhile, the average value on the aspect of science attitude in the experimental class got a value of 87.7 and the control class got a value of 83.6.

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