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Ecoliteracy of Junior High School Students in Science Lesson on Environmental Pollution Theme

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abstract

The low ecoliteracy of students impacts students' low awareness of the environment. This study aims to analyze the ecoliteracy profile of junior high school students. This research is a descriptive study conducted on the seventh-grade students of junior high school with a total of 80 students consisting of 33 male students and 47 female students with purposive sampling. The instrument used in this study was an ecoliteracy test in the form of multiple choice and 20 essay questions. The data collected was analyzed descriptively quantitatively by calculating the percentage of students' acquisition of ecoliteracy and then categorized. The results showed that the average ecoliteracy of students was 50%. The average addition of ecoliteracy on each indicator knows environmental problems (75%), having an action strategy on environmental problems (50%), following up on environmental problems that occur (45%), and having quality in responding to environmental problems and personal attitudes good at 30%. This proves that the level of student ecoliteracy is still relatively low, and efforts need to be made to increase ecoliteracy in students.

1. Introduction

The environment is not only considered a place for living things to live, but more than that, the environment is a productivity of the synergy of the universe in which life contacts exist between nature and the behavior of living things (Putri & Nikawanti, 2017). Activities like this cause various changes that directly have a positive impact as well as a negative impact on the environment. The current environmental damage is increasing. The increasing number of humans over time has become one of the causes of environmental damage (Baderan et al., 2019). The lack of community-owned ecoliteracy contributes to the level of ecological damage, as stated by Rijal in (Siddiq et al., 2020). Concern for the environment will arise when someone has understood the importance of the environment for life. Understanding the environment can be referred to as ecoliteracy (Nurfajriani et al., 2018). Meanwhile, according to (Supriatna 2016), ecoliteracy is awareness, understanding, and scientific literacy about the environment.

In making decisions and information about actions to solve environmental problems, this is called ecoliteracy (Lewinsohn et al., 2015). Ecoliteracy is human awareness in protecting and preserving nature. Individuals can possess this awareness through a lifelong learning process which will ultimately shape knowledge, attitudes, character, and skills in processing and

preserving nature. These conditions create a sustainable society or ecoliteracy. People have understood the principles of ecology and live following environmental principles in managing a life together with humanity on earth (Keraf, 2010).

This is in line with the explanation from Capra in (Nurfajriani et al., 2018) that ecoliteracy is the moral awareness of the human community to respect biotic communities. The position of humans in ecoliteracy is to be literate on critical issues and provide effective and wise solutions related to the environment, both in the human environment and the global environment. This is in line with the opinion (Arga et al., 2019), which states that ecoliteracy is a new concept, paradigm, and value that is included in education towards "earth welfare," which initiated a movement in an effort to care about knowledge, care for the environment and aims to increase people's ecological awareness. The 2013 curriculum emphasizes student character education. According to Mulyasa (2013), in the national education strategy plan, there are at least five main problems whose solutions must be prioritized, one of which is character education. Character education can be integrated into all learning in every field of study contained in the curriculum. Ecoliteracy should be integrated into the curriculum so that it can be effectively taught and mastered by students. The ability of ecoliteracy is a positive value for the environment that is very in line with the 2013 Curriculum, which focuses on character education. Building ecoliteracy at the age of children and adolescents is very important in overcoming today's environmental problems (Stevenson et al., 2013).

According to the North American Association of Environmental Education (NAAEE) (2001), environmental education is a complete and comprehensive process to help humans understand the environment and its problems. Neal (1995) states that to increase students' awareness of the environment, students need to be given interesting motivation, then guided to make observations. This is supported (Risda Amini & A. Munandar, 2010), which states that equipping students with knowledge about the environment from an early age is very strategic. It aims to make students care about their environment. Some of the reasons behind the urgency of children to get ecoliteracy education include first, positive interaction with the environment is important for developing children's health. Second, ecoliteracy education can improve learning ability and quality of life journey. Third, children will see nature as a source of admiration, joy, and charm. Fourth, the child's soul will be enriched by nature, and the child will find the source of human sensitivity through nature (Kurniasari, 2018).

Based on the results of observations that have been made to junior high school students in the Bogor district, it is stated that the attitude of students' concern for environmental problems is very low. They tend to be indifferent to the environmental conditions around them and think that environmental problems are not big things that must be focused on in their daily lives. This shows the lack of understanding, awareness, and environmental friendliness, and the low level of ecoliteracy. Learning in the classroom generally still rarely raises awareness and environmentally friendly behavior because most environmental problems are still limited to the cognitive domain, so it is not surprising that what happens is that knowledge about the environment is memorized, dwelling on the definition of the textbook provided, from schools to students to evaluation sheets (Tamam, 2016). To improve ecoliteracy, a learning process is needed that directs students to be active and creative. Creative in the sense of having the ability to think about something in a new and unusual way and produce a unique solution to a problem (Putri et al., 2019).

Science learning is expected not only to teach concepts but also to have real action/application of these concepts, especially concepts related to the environment. The ecoliteracy component is needed as an appropriate reference in the process of mastering environmental concepts and their application by students. The nature of science learning is a product and process, so that the assessment of science learning involves the assessment of

products, values, learning outcomes, and learning processes. The assessment that a teacher should carry out in assessing the achievement of student competencies is an assessment that assesses learning outcomes and assesses student learning processes during learning activities (Mawardini et al., 2015). Ecoliteracy in learning has positive pedagogical goals and aspects of being applied in the learning process in all fields of study, especially in the field of Natural Sciences (IPA) from preschool to university level. Therefore, in this study, researchers seek to apply the integration of ecoliteracy in the 2013 curriculum, which focuses on character and competence so that ecoliteracy abilities can be included in themes that are adapted to learning materials. In this study, the theme of Environmental Pollution was taken. The integration of ecoliteracy in science learning leads to the achievement of students' mentality with environmental insight (Syukron, 2018).

Previous research related to ecoliteracy education was also conducted by (Muliana et al., 2018), which stated that lecturers at Syiah Kuala University Banda Aceh had a moderate level of ecoliteracy. Based on the data obtained, there are 124 (51.66%) respondents who are in the medium category, 59 (24.5%) of the respondents are in a low category, and only 67 (23.75%) of the respondents are in the high category. Research on ecoliteracy at the junior high school level has been carried out by (Tamam, 2016); the results of the research are that Green Consumer activities in science learning can improve student ecoliteracy at SMP Negeri 1 Ciruas, Banten.

Based on the background described above, it is necessary to conduct research on the ecoliteracy profile of junior high school students in science learning. The purpose of this study was to determine the level of student ecoliteracy in learning at school. Ecoliteracy is important for students considering that ecoliteracy is one of the efforts to realize sustainable development launched by UNESCO in the field of education and the environment (McBride et al., 2013)

2. Method

This type of research is qualitative descriptive research. This research was conducted in three private junior high schools in Bogor Regency, class VII for the academic year 2020/2021. The population in this study amounted to 200 students. Determination of the number of samples was calculated using the Slovin formula with e = 5% so that a total sample of 80 students consisted of 33 boys and 47 girls. The sample was determined using the purposive sampling technique.

Data collection uses a written test with a google form format. The instrument used in this study was an ecoliteracy test in the form of multiple-choice questions and 20 essay questions. Students' ecoliteracy ability was measured using an ecoliteracy test adapted from the Middle School Environment Literacy / Survey (MSELS) developed by the National Environmental Literacy Assessment (NELA) (2008). The test consists of four indicators, namely knowing environmental problems, having an action strategy on environmental problems, following up on environmental problems that occur, and having quality in responding to environmental problems and good personal attitudes.

The ecoliteracy test instrument was content validated and tested on a small scale. This treatment aims to obtain reliable question/statement items. Content validation was carried out by three experts. The instrument trial was conducted on 100 seventh-grade junior high school students. The results of content validation were analyzed using the content validity ratio (CVR). The components assessed are the item's suitability with the context of the question and the suitability of the item with the question indicator.

The ecoliteracy test answers are then corrected based on the multiple-choice test scoring guidelines, if the correct answer is given a score of two, doubtful is given a score of one, and the wrong answer is given a score of zero. Each student's correct answer is converted into a percentage and then interpreted according to their respective indicators. All students' correct

answers for each item were processed as proportional correct answers. The analysis is used to see the students' ecoliteracy ability by calculating the average score of students obtained from the results (Wulandari, 2017).

3. Result and Discussion

The data obtained in this study is descriptive data in the form of percentages. This quantitative data is in the form of students' answers in working on ecoliteracy questions, which were developed in accordance with environmental pollution materials. In the matter of ecoliteracy, there are four parts of the main components in ecoliteracy, namely knowledge, cognitive abilities, attitudes, and behavior.

Based on the results of the student's ecoliteracy test, the average score of students was 50%. These results indicate that the level of ecoliteracy of junior high school students in Bogor Regency is still low. From Table 1, we can see that in the indicators revealing environmental problems, only 70% of the 80 students answered correctly. This is obtained from the results of students' elaboration on the disclosure of environmental problems that are usually carried out in accordance with what is in the problem. Students are able to answer correctly because they are often trained so that students are able to express some of the problems described in the problem, according to what was written by (Sariningsih, 2014) which states that student understanding helps develop thinking in analyzing events to make decisions from the problems given. To practice this understanding, students need to be trained with various learning models and learning media in the learning process in the classroom.

In the strategic indicator of environmental problems, the average score of students is 50%. Only half of the students answered correctly, due to the lack of students' understanding of the environmental problems that occurred. They do not understand how to solve an existing environmental problem because it often happens but are not taught to solve the problem or go directly to the problem. While the indicators for following up on environmental problems, the average score obtained by students is in a low category, which is only 45%. The lack of understanding of ecoliteracy and low environmental awareness make various environmental problems that often occur in the vicinity ignored without any follow-up to resolve or provide the best solution. Students are less emphasized on the attitude of caring for the environment.

Indicators addressing environmental problems related to personal attitudes get a very low score of 30%. This indicator relates to students' attitudes and social actions towards existing environmental problems. This can happen because in science learning, students are only transferred knowledge without any further application related to it, so the sensitivity of their attitude towards the environment is considered to be very lacking. With such basic conditions of students, if in the learning process good knowledge is not transferred and ecoliteracy (environmental ethics) is not taught, it will affect the life of the next universe. According to Suyono and Hariyanto (2014), the role of the teacher (teacher) is very important in determining the direction of learning, the teacher as a designer, potential builder of students, learners, initiators of learning, maintainers, and achievers of the peak of success in the learning process.

Table 1. Results of students' ecoliteracy ability

No	Indicator	Percentage
1	Knowing environmental problems	75%
2	Have an action strategy for environmental problems	50%
3	Following up on environmental issues	45%
4	Responding to environmental problems related to personal attitudes	30%
	Average	50%

The results of the analysis of ecoliteracy descriptive data (Table 2) from 80 junior high school students in Bogor Regency obtained a minimum score of 50 and a maximum score of 80. The highest score is found in indicators describing various environmental problems. While the lowest score is found in the indicators of addressing environmental problems, which are balanced with students' personal attitudes. Measuring the ability of ecoliteracy is very necessary to determine the extent of a person's ecoliteracy ability so that it can be followed up to improve that ability. According to (Prasetiyo, 2017), ecoliteracy consists of four parts: students' knowledge of the environment, cognitive skills, and attitudes and behavior towards the environment. The literacy section is also a component of assessing a person's ecoliteracy ability. This is in line with the statement (McBeth & Volk, 2009) that the ability of ecoliteracy consists of four components, namely environmental knowledge, which includes the basics of the environment; attitude towards the environment, which includes views about the environment, sensitivity to environmental conditions, and feelings towards the environment, cognitive skills which include identification of environmental problems, environmental analysis, and planning implementation, and behavior which includes concrete actions towards the environment.

Table 2. Description of student ecoliteracy results

Statistics	Description
Number of Question	20
Number of Students	80
Minimum Score	50
Maximum Score	80
Mean	50
Median	70
Modus	70
Standard Deviation	5,5

The results of the study regarding the knowledge, strategies, follow-up, and attitudes of students towards the environment were relatively good. Even though they have not been able to actively participate, at least most of the environmental problems have been known and addressed by students. The formation of attitudes does not necessarily form just like that. As proposed by Wibowo (2009), there is a process that attitudes and behavior are formed by cognitive, affective, and conative components. Attitude is a person's response to an object due to thoughts and judgments based on the knowledge he has. Attitudes are formed through the learning process. There are four kinds of learning: classical conditioning, instrumental conditioning, learning through observation, and social comparison (Wibowo, 2009). The four processes should be formed in the school environment in fostering student ecoliteracy.

Classical conditioning is a learning process that occurs when one stimulus is followed by another. Instrumental conditioning occurs if a behavior has a pleasant effect on him, then the behavior will be repeated. Social comparison learning is to compare his views with others on something. If the conclusions from the comparison are considered in accordance with the social view, students will not hesitate to take these attitudes and behaviors. Students can also think about taking a stand and making a decision to take action based on experience and information obtained about the environment in accordance with Piaget's theory of development. Adolescents aged 15 years reaching stage IV (adolescent age) is the formal operational period (11 onwards). At this time, children can think abstractly and hypotheses. Can conclude the question. Already able to predict the possibility of an event occurring. Teenagers are able to look at problems from various perspectives and solve problems in various ways.

The overall assessment results can be stated that most (50%) students already know and are trying to participate even though they are not based on much knowledge about environmental problems. Most of the students are new to the level of knowing there is a problem but have not tried to find the root of the problem and efforts to overcome it. For example, students know the dangers of water pollution and air pollution, but almost all (70%) students do not make efforts to save water and minimize air pollution. However, the behavior is easy and can be done by students.

If using Coyle's statement in (Disinger & Roth, 2000) that ecoliteracy has three levels; namely, the first level of environmental literacy involves environmental awareness. The second level of environmental knowledge combines awareness and action based on knowledge. The third level is the deepening of actual information and skills. So the new student ecoliteracy arrived at the first level. And if you use the statement (Adisendjaja & Romlah, 2008) in dealing with environmental problems, there are three phases. The first phase is awareness of the problem. The second phase of problem analysis is to identify the root cause of the problem. The three phases develop strategies to correct existing problems and prevent them from happening again in the future. Then the new students are in the first phase.

To develop students' ecoliteracy, many things need to be done, including learning the scientific process carried out by science teachers in schools, to form students' reasoning abilities in dealing with environmental problems. Outdoor activities stimulate the family's natural intelligence to grow sensitivity, awareness, responsibility, and desire to love nature as one loves oneself, regard nature as part of their family, and government policies as aspects that have legal force in dealing with environmental problems. Schools carry out their duties as agents of change. The process of environmental education in schools should be able to change the mindset and culture of the community towards the environment. So that the community's environmental awareness grows for sustainable development and the preservation of the nature in which we live.

4. Conclusion

Based on the results of the analysis and discussion, it can be concluded that the students' ecoliteracy ability is the lowest on the indicator of addressing environmental problems related to ethics and the highest on the indicator of understanding environmental problems so that with such a profile it is necessary to solve problems on students' ecoliteracy abilities. It is hoped that further research can explore the level of ecoliteracy in junior high school students and conduct further research on the practice of ecoliteracy learning in junior high school, as well as linking it with other variables that are not included in this study so that ecoliteracy learning in junior high school becomes better.

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