



Student Eco-literacy in Preventing Ecological Damage

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ABSTRACT

This study aimed to determine student eco-literacy by giving projects in the Waste Management course. This qualitative research uses a survey approach to obtain data from certain natural places (not made by researchers). Still, researchers carry out the treatment in collecting data by distributing questionnaires and giving eco-literacy projects to 26 FKIP UMMA students. The data analysis technique used was Miles and Huberman's data reduction. The analysis showed that all aspects received a positive response from students of 98%. It means that students were interested in writing to take part in learning by utilizing the environment as a source of learning. The projects produced by students showed an attraction to eco-literacy learning by giving projects.

Ekoliterasi Mahasiswa Dalam Mencegah Kerusakan Ekologi

ABSTRAK: Tujuan penelitian ini untuk mengetahui ekoliterasi mahasiswa dengan pemberian proyek pada mata kuliah Pengolahan Limbah. Penelitian ini merupakan penelitian kualitatif dengan menggunakan pendekatan survey, metode survey digunakan untuk mendapatkan data dari tempat tertentu yang alamiah (bukan buatan peneliti) tetapi peneliti melakukan perlakuan dalam pengumpulan data dengan mengedarkan angket dan pemberian proyek ekoliterasi pada Mahasiswa FKIP UMMA berjumlah 26 orang. Teknik analisis data yang digunakan yaitu reduksi data Miles and Huberman. Hasil analisis diperoleh bahwa seluruh aspek yang dinyatakan sebagai kemampuan ekoliterasi mahasiswa proyek mendapatkan respon positif dari mahasiswa sebesar 98%. Hal ini berarti mahasiswa tertarik secara tertulis untuk mengikuti pembelajaran dengan memanfaatkan lingkungan sebagai sumber belajar begitu pula dengan proyek yang dihasilkan oleh mahasiswa menunjukkan bahwa ada daya tarik pembelajaran ekoliterasi dengan pemberian proyek.

INTRODUCTION

Complex community activities are the most significant factor in environmental problems. The low public awareness and concern in shaping environmental care behavior is an apparent lack of

understanding of ecological principles (Rosdiana et al., 2020). Istiana et al. (2020) gave examples of campus community activities that often ignore the condition of the surrounding environment. Educators, teaching staff, and students usually do not care about the campus environment's state.

Even though an attitude of caring for the environment based on local wisdom has been promoted in the Maros Muslim University campus area, there are still many contradictory activities, plastic waste is still found scattered, and there is a lack of student participation in environmental activities.

Concern for the environment is a preventive effort or prevention of actions that can cause damage to the surrounding environment and seeks to think about repairing the damage to nature that has occurred (Surjanti et al., 2020). This is in line with Haka et al. (2020). The environment has natural resources that have components and interactions in them, so they need to be maintained to not cause damage to the natural environment.

The results of observations obtained by researchers in the field during learning and outside the classroom show that student eco-literacy is still low. This can be seen from the lack of student concern for the surrounding environment, which can be observed from their behavior where only a small number of students care about the waste/garbage they find around them. In addition, the lack of interest in students getting to know more about waste treatment technology which is very beneficial for the environment, also greatly influences the attitude toward caring for the environment.

Based on the above conditions, innovation in learning is needed, namely by deepening student eco-literacy by utilizing simple waste treatment technology, which can be used as a reference for increasing student eco-literacy following the vision, mission, and goals of Maros Muslim University, namely realizing environmentally sound education and local wisdom, so that later it is expected to be able to improve the role of students in protecting the surrounding environment to create an environmentally friendly campus. (Fachrudin, 2020) defines an environmentally friendly or green campus as one with an ecologically sound perspective, namely one that integrates environmental

science into the policies, management, and activities of the tri dharma of higher education. Several things become challenges for realizing an environmentally friendly campus, including the problems of understanding, planning, supervision, funding, and communication (Febriani, 2022; Mukaromah, 2020).

Environmental problems due to a lack of human awareness necessitate the early introduction of eco-literacy (Muthukrishnan, 2019). Then, web-based module learning media can deal with environmental problems by placing them into learning. The effectiveness of the web-based science module that was previously developed showed a significant effect on students' problem-solving (Miswami & Nurcahyo, 2020), thinking skills (Putri & Aznam, 2020), and activities improvements (Astuti et al., 2020).

In the learning process carried out, learning related to the environment is the main subject so that students can recognize and have a caring attitude and responsibility, usually known as eco-literacy (Krisnawati et al., 2022).

In biology education, the relationship between living things and nature is the most crucial factor in preserving the environment. One is the learning process about eco-literacy, often called ecological intelligence, derived from the Greek words *oikos* (habitat) and *logos* (science). Ecological intelligence is complex. This intelligence is supported by cognitive, affective (social and emotional), and psychomotor elements. The desire to protect the environment is based on environmental knowledge. Awareness to save a damaged environment is based on affective aspects, while actions to preserve the environment describe psychomotor aspects. The eco-literacy indicators include aspects of knowledge, awareness, and application. Researchers focused on these three indicators because if there is insufficient knowledge and understanding of the importance of protecting the surrounding

environment, it will result in environmental damage.

Based on the Global Competitive Index results, Indonesia is ranked 45 out of 140 countries with three main problems that require priority treatment: primary education, the economy, and the environment. This achievement is not good enough when you look at the current demographics of the Indonesian nation. A serious problem that has become a world concern for Indonesia is the low level of eco-literacy and the problem of waste, especially plastic waste (Aziz et al., 2022).

Eco-literacy learning is not only the delivery of theory but must combine theory and practice directly. The goal is to improve students' knowledge, attitudes, and skills in eco-literacy in daily life so that environmental conditions will be better for both the current and future generations (Setyaningrum, 2020)

Eco-literacy improves environmental problem-solving through knowledge, behavior, and attitudes. Similar research suggests that eco-literacy learning will go well if clear learning objectives are set to enhance students' cognitive and psychomotor aspects. (Sholihah et al., 2020). When individual learner is instilled with good ecological literacy, they will have high environmental knowledge and improve their attitudes toward environmental protection and management (Syah et al., 2021; Kavaz et al., 2021).

Eco-literacy focuses on education in which all aspects of learning are based on nature so that you fully appreciate the principles that work in nature in your daily life. Eco-literacy is needed to reach the action stage. Humans must realize and feel, not just know (Ihsan & Hanami, 2020). The environment plays an essential role in realizing the attitude and responsibility of caring for the environment. Through education, students are regulated in saying, behaving, or behaving that shows the good character (Auliyairrahmah et al., 2021).

The importance of eco-literacy being instilled in students to solve environmental problems by increasing eco-literacy knowledge, attitudes, and skills in everyday life is very interesting to research and study (Salimi et al., 2021). In this study, researchers gave students projects to find out about student eco-literacy in waste treatment. Andriyani & Suniasih (2021) argue by utilizing the simple technology around them. It is hoped that students will be able to find and recall knowledge about the environment that they have previously obtained. In this study, researchers did not determine what technology students should use in eco-literacy projects but adjusted it to local wisdom in their regions. Like the group in whose area there is a tofu factory, the group was then asked to do a project for processing wastewater from the tofu and other groups. Each group has the opportunity to find their solutions to existing environmental problems following local wisdom in their respective areas so that students not only know the theory but can apply it in everyday life.

Research that is relevant to this research, namely (Wardaniah et al., 2019) using the Group Investigation learning model to determine student eco-literacy, the results of this study indicate that student eco-literacy after carrying out group investigation-based waste management activities at SMAN 1 Moyo Utara in the 2017/2018 academic year is categorized as sufficient. Research result (Rabbianty et al., 2022) shows students' awareness level is in the high category. However, the level of student behavior is in the medium category. This finding illustrates that students are already at the conscious stage where an environmentally friendly demeanor is essential. However, in its implementation, it still has a moderate category, so ecologically friendly awareness is only limited to theory and not practiced by all students who are perfect respondents.

Eco-literacy learning in elementary schools is essential and can be improved

through problem-solving, project-based models, and eco-literacy teaching materials. Nature school contributes well to understanding eco-literacy, spiritually, emotionally, and activity. Learning that provides direct experience makes learning meaningful so that a sense of empathy for fellow living beings is present in students' souls. In addition, imaginative learning can also foster students' critical thinking. As a recommendation from this study, there is a tendency to research eco-literacy in learning in the teaching materials used. Still, a particular model or method of eco-literacy learning is needed (Safitri et al., 2023).

METHOD

This research was conducted at the FKIP of the Muslim University of Maros with 26 research subjects studying waste management courses. This qualitative research uses a survey approach to obtain data from certain natural places (not made by researchers), but researchers carry out treatments in collecting data by distributing questionnaires. The questionnaire used in this study was a closed (structured) questionnaire containing statements related to understanding eco-literacy obtained in waste management lectures. The data source for this research is literacy in the form of products or works related to eco-literacy (Hamzah, 2020).

According to Sugiyono (Lestari et al., 2022), the data analysis technique used was Miles and Huberman data reduction. Miles and Huberman suggest that activities in qualitative data analysis are carried out interactively and continuously until completion, so the data is saturated. Data analysis has three activities: data reduction, data display, and conclusion drawing/verification. Presenting data is an activity carried out to describe phenomena or conditions following data that has been reduced first. By carrying out data

presentation activities, it will make it easier for researchers to understand what is happening in the field and then interpret the explanation about the eco-literacy of FKIP UMMA students.

Questionnaires can be analyzed with the following steps: 1) counting the number of students who gave positive responses according to the aspects asked, then calculating the percentages, and 2) determining the categories for positive student responses by matching the percentage results with the established criteria. The criteria set to say that students have a positive response to the learning model is more than 50% of students respond positively to at least 70% of the number of aspects asked. Students' positive responses to learning are said to be achieved if the criteria for positive responses to aspects of teaching materials are met (Lestari & Ernawati, 2022).

There are several simple steps to implementing eco-literacy in schools, including the first step of transmitting this eco-literacy movement to students by conveying the theory of eco-literacy. The second step can be started by practicing activities to maintain and use the environment well. The third step is to evaluate by providing advice and input to policymakers in schools regarding the implementation of eco-literacy (Oktapyanto, 2017).

RESULTS AND DISCUSSION

26 students were involved from biology, mathematics, and physics education study programs who programmed waste management courses by providing projects in the form of simple waste treatment by Utilizing waste around the environment to increase student eco-literacy. The results of the data analysis can be seen in Table 1 below:

Table 1. Questionnaire Analysis Results

No	Responded aspect	Student response				(%)
		STS	TS	S	SS	
1.	The introduction of eco-literacy makes it easy and encourages me to study independently and in groups	0	1	19	6	96
2.	My eco-literacy is learning to be better at waste treatment	0	0	16	10	100
3.	Literacy strongly supports learning steps	0	1	15	10	96
4.	Learning using eco-literacy encourages me to learn more independently and in groups	0	0	16	10	100
5.	Gives me a better understanding of learning than before	0	1	16	9	96
6.	I am always actively involved in learning both independently and in online groups	0	0	16	10	100
7.	I absorb more lessons on learning	0	0	16	10	100
8.	I have had many learning experiences with various sources of waste management literacy	0	0	14	12	100
9.	I easily understand the concept of waste treatment	0	0	13	13	100
10.	The stages of learning helped me in the process of absorbing biological knowledge	0	0	11	15	100
Total Average						98

From the results of the questionnaire analysis, it was found that all aspects stated as students' eco-literacy abilities, the project received a positive response from students by 98%. It means that students are interested in writing to take part in learning by utilizing the environment as a learning resource. In this study, students were given a simple waste treatment project to know students abilities and increase their eco-literacy. Presenting the project allows students to work more independently, developing their learning.

The lecturer no longer dictates to students the material they must know. Still, they are trying to build their knowledge by being actively involved in a complex learning

process to store their knowledge properly because the impressions obtained in achieving understanding are more meaningful (Lestari & Ernawati, 2022).

The eco-literate attitude of students can increase the effect of learning by giving projects. Therefore, selecting teaching materials using project-based learning techniques is appropriate because not all teaching materials can be taught with these techniques. Educators must properly prepare materials, media, and learning time before implementing project-based learning techniques. Thus, project-based learning techniques can run smoothly and improve students' creative thinking abilities (Rudiana et al., 2022).



Gambar 1. Utilization of Waste Treatment Ecoliteration

Figure 1. above shows some examples of the results of eco-literacy projects carried out by students. The results of the observations show that the completion of projects undertaken by students includes various concepts of waste reuse, both organic and inorganic waste. The production and fulfillment of these tasks are carried out by utilizing and maximizing used materials and goods in the surrounding environment, such as domestic waste in the form of leftover vegetables and fruit, plastic, and other used goods that are no longer used. Using these materials and goods shows an increase in students' eco-literacy abilities in waste processing.

The results of this study indicate that giving projects can improve the eco-literacy abilities of FKIP UMMA students, especially in the Waste Management course. It can be seen from the results of projects that utilize waste or used goods found in the surrounding environment. Similar to the effects of research that have been done previously, it shows that the application of project-based learning can support and improve students' eco-literacy abilities by as much as 70% -85%. (Rudiana et al., 2022).

Project delivery (PJBL) is based on constructivism theory. It is student-centered

learning that allows educators to "learn from students" and "learn with students" and can improve their eco-literacy skills. Ecoliterate learning will go well, if in learning there are clearly defined learning objectives, both to increase the knowledge, attitudes, and skills of students (Pandikar, 2020)

Eco-literacy is closely related to the attitude of caring for the environment, in line with research which states that there is a significant influence on eco-literacy practices on students' environmental care attitudes (Pandikar, 2020). The research results on education-oriented eco-literacy learning practices for sustainable development are also quite good, as can be seen from the learning conditions, learning methods, and learning outcomes that are effective, efficient, and attractive in learning (Setyaningrum, 2020). In line with the study's results (Tryanasari & HS, 2021), the eco-literacy program can increase the focus on students with special needs.

Eco-literacy is very important for each individual. The term eco-literacy means measuring one's ecological knowledge and ability to apply that knowledge to one's lifestyle and routine. Furthermore, eco-literacy directs an individual's understanding of ecological concepts and makes a person understand the place, space, and

environment of his life (Aditya & Oktavilia, 2020).

The findings in this study are that students already have a basic theory of eco-literacy and project giving and then practice it in waste treatment with simple technology that is easy to find around them. In addition to project-based learning, students can solve existing waste problems and find solutions after discussing them with their group mates. So according to Nadiroh & Siregar (2019), learners/students can be directed to the ability to solve environmental problems through learning models that may still be developed during the learning process to help solve more complex environmental issues.

In addition to learning models, it is also necessary to develop eco-literacy learning tools to make it easier for students to understand eco-literacy (Firdausi & Wulandari, 2021). Putri & Aznam (2020), a web-based science module with guided inquiry to improve implemented students' thinking skills, found that experimental group thinking skills taught using web-based science with guided inquiry increased more effectively than the control group. On the other hand, (Zahroh, 2020) found that web-based thematic modules developed did not significantly impact students' learning outcomes and digital literacy skills. In contrast, the current study focused on a web-based science learning module integrated with eco-literacy to improve students' understanding of eco-literacy, which is claimed to be very important to be taught (Ikhsan et al., 2019; Williams, 2017) to reduce the lack of sufficient knowledge in preserving the environment (Nadiroh et al., 2019).

The limitations of this research are the parties involved in the eco-literacy practice, so it still needs development in practice concerning sustainable development. Parties involved in education in developing innovative waste management programs that require educational values and concern for the environment (Aziz et al.,

2021). A person's eco-literacy is always characterized by knowledge or understanding of ecological principles and attitudes or actions that coexist with nature. As one of the efforts to reduce environmental problems, eco-literacy needs to be developed to become an ecologically literate person. (Maulana et al., 2021). Ecological literacy implies understanding how people relate to each other and nature and how they do so sustainably. Ecological literacy is often known as eco-literacy, which is a way that aims to realize the process of sustainable environmental management (Oktarina et al., 2020).

CONCLUSIONS AND SUGGESTIONS

The eco-literacy of FKIP UMMA students in the waste treatment course can be seen from the project results in reprocessing waste in the surrounding environment. With a positive response, it shows that students are interested in learning by giving projects that automatically affect student eco-literacy.

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