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The Effectiveness of Project Based Blended Learning Ecoliteracy E-Module to Improve Environmental Care Character

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(Use Times New Roman Font: 14 pt, Centered) (Names should be written in First Name Surname order)

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Abstract. Environmental care character education is a serious concern in the midst of technological advances that continue to develop. The hope is accompanied by an increase in the character of caring for the environment for students to be more adequate. But in fact, the problem of character is increasingly complex, especially in basic education. The low awareness of students' environmental concerns is increasingly concerning. Salah one way to increase the character of caring for the environment is by integrating students into school subjects. This study uses the E-Module Ecoliteracy based on project-based blended learning to increase environmental awareness. The research method is quasi-experimental and uses a posttest-only control design type, where researchers cannot control all external variables that affect the course of the experiment. Project-based learning is in great demand by elementary school students because it can explore the potential for creativity and the ability to work together. New normal learning using learning technology is impossible to abandon, teachers can still use it for the learning process, one of which is by using a blended learning model. The posttest value for the control class obtained an average value of 79.25. Meanwhile, the posttest scores for the experimental class obtained an average score of 88.45. This proves that there is a significant difference in values between the control class and the experimental class, of course, due to good collaboration in the use of project-based blended learning Ecoliteracy E-Modules between teachers and students, students and students, and the role of parents.

INTRODUCTION

The goals of the Sustainable Development Goals (SDG's) were made to answer world demands in overcoming five problems, namely humanity, planet earth, prosperity, peace, and partnerships that are interrelated to one another[1]. When there is a change in human behavior in protecting nature, peace, and the preservation of other living things, then the earth as a place to live will be well preserved. Humans and the environment are two interrelated components. Humans need various resources in the environment to meet their needs, and the environment will be sustainable with human intervention. In the past two years, the COVID-19 pandemic has contributed to the most plastic, medical, and Personal Protective Equipment (PPE) waste, and even increased to the mouth of the Jakarta Bay river, around 46-57% of the total waste found, for PPE alone, it contributes 16%, around 0.13 tons per day, it is clear that this can harm the ecosystem[2]. According to the Indonesian Institute of Sciences (LIPI) Earth Sciences Deputy, Agus Haryono, revealed that the data shows an increase in plastic waste along with increased online shopping during the pandemic, and plastic waste is not properly processed and so it ends up in the sea[3].

In addition to increasing plastic waste, climate change in Indonesia has an impact on global warming, decreasing the quality of health, agricultural products, and water resources. Maybe not many people understand the relationship between climate change and sustainable development in Indonesia. The Environmental Quality Index (EQI) is a

national environmental management performance indicator that can be used as information material to support policy-making processes related to environmental protection and management. The national EQI score is a national environmental management performance index[4]. As an indicator of environmental management in Indonesia, EQI is a combination of the Environmental Quality Index (EQI) concept and the Environmental Performance Index (EPI) concept. EQI can be used to assess the performance of environmental quality improvement programs and as information material in supporting policy-making processes related to environmental protection and management.

This problem is a serious problem that must be faced and is of particular concern to the world of education and the family. Shifts in personality orientation such as morals, morals, lack of awareness of caring for the environment marked by littering, environmental damage, and air pollution cause inconvenience to live in a society[5]. Various actions that are concerning do not care about cleanliness, for example, the cleanliness of toilets in schools, cannot separate organic and inorganic waste. Waste problems will always be related to human social and economic activities. The increasing number of people with various complexities of economic and social activities results in a lot of waste or waste being produced, such as waste from consumption product packaging made from paper, plastic, cans and Styrofoam[6]. The fact is that waste from consumer product packaging becomes a pollutant for the environment because it is difficult to decompose and takes a relatively long time.

Many researchers have revealed that children are not only victims of climate change but also actors in climate change[7]. So as a pillar of Education, parents, schools and the community need to bridge the learning process so that the character of caring for the environment can be created with an Adiwiyata or environmental-based curriculum.[8]. So the importance of awareness and changes in caring behavior towards the environment is implemented from an early child.. eds to be introduced to students and integrated into a curriculum. The concept of ecoliteracy includes knowledge, understanding, and skills to participate in the environment[9],[10]. The classroom is the initial place for the formation of habituation of awareness of environmental concern, thus forming an ethic in life[11]. This habituation can be integrated into integrated thematic learning in elementary schools. Teachers can provide an initial introduction to habituation and eventually become a character.

One model that can be applied in learning in the new normal era is the blended learning model. Technology-based learning cannot be abandoned because of the needs and developments in technology that can be implemented in the learning process, especially in elementary schools. With direct involvement by making a project and increasing feedback between teachers and students that blended learning provides a memorable experience for learning about the time and place of learning while doing[12]. Teachers can do mixed learning based on project based learning to produce a skill in utilizing used goods to be useful. This project allows the teacher to monitor its progress by doing it face to face and online[13]. Based on the existing problems and phenomena, project-based blended learning using the Ecoliteration E-Module is expected to increase the character of caring for the environment for elementary school students.

LITERATURE REVIEW

In this section, we will discuss how the concept of project-based learning uses ecoliteracy e-modules to increase the character of caring for the environment in elementary school students. There are many ways that educators can do to improve the character of caring for the environment in elementary school children. But by understanding the characteristics of 21st-century students they are very close to technology, so one way that can be done is by using blended learning.

Ecoliteration E-Module for Elementary School Students

Ecoliteration based on Goleman's perspective includes 1) developing empathy for all areas of life, 2) practicing survival as the action of community groups, 3) making what is seen become more visible, 4) anticipating unexpected impacts, 5) understanding how natural life takes place[14]. Based on this understanding, it can be said that ecoliteracy is not just understanding the environment, but having a sense of empathy and acting directly on the environment. The results of the study prove that by using the ecoliteracy understanding module students increase so that it can be implemented in everyday life[15]. The existence of teaching modules can make learning more effective and efficient so that practical learning concepts can be carried out anytime and anywhere[16]. Teachers can carry out learning using modules that can be uploaded to the LMS or the learning platform used to make it easier for students to study independently[17]. Learning by using the E-Module student creativity is growing and learning collaboratively becomes an integral part so it can encourage students to be more active in the learning process[18]. E-Module Ecoliteracy is a form of innovation in the development of teaching materials that can be used by teachers in the blended learning process[19]. Teachers can also provide E-Modules based on environmental literacy through a scientific

approach so that students are invited to observe, formulate problems, propose/formulate hypotheses, collect data using various techniques, analyze data, draw conclusions, and communicate facts through information from various sources[20].

Environmental Care Character

Character education is defined as a process of individual change from family, school, and social life[21]. Character education is defined as a process of individual change from family, school, and social life. Elementary school age needs special attention to character building and the many factors and dimensions that can improve children's character [22]. When learning during COVID-19 teachers find it difficult to internalize and implement character values, when learning is done online, this problem occurs because teachers are used to interacting face-to-face with students. The teachers revealed that the curriculum was considered inappropriate for character development because they were still confused about the implementation of the curriculum in thematic learning in elementary schools[21]. Educator resources are a determinant of achieving character education for every school that applies it in various ways to character education programs in schools[23]. Character education can still be implemented virtually or online learning through aspects of habituation, integration, and imitation that teachers can convey in the learning process both face-to-face and online with the help of teaching materials or modules[24]. Character education can also be implemented by teachers to students integrated with lessons in elementary schools thematically by using appropriate learning strategies and models[25]. Seeing the phenomenon of the decline in the character of students, one of which is caring for the environment, has become one of the focuses of various studies conducted. Schools can integrate environmental care character education through the ADIWiyata program[26]. Ecological education is urgently needed in order to hone the sensitivity of students with an awareness of the existence of the environment as part of an ecosystem that influences sustainable life[10]. Environmental care character education can be carried out in collaboration at schools and also, of course, with the support of the community and parents who exemplify the positive habit of protecting and caring for the environment[7].

Project-Based Blended Learning

Looking at the characteristics of 21st-century students, they tend to be close to technology. So as educators should be able to understand how. There are appropriate strategies for learning in the 4.0 era. learning using the Project Based Blended Learning (PJB2L) model requires an integrated online learning processing system such as a Learning Management System (LMS) or other device platforms that can support learning[27]. After learning is carried out face to face, then the students carry out activities to complete the project by monitoring the teacher through the LMS, the following is a login image for the LMS and the student activity menu:

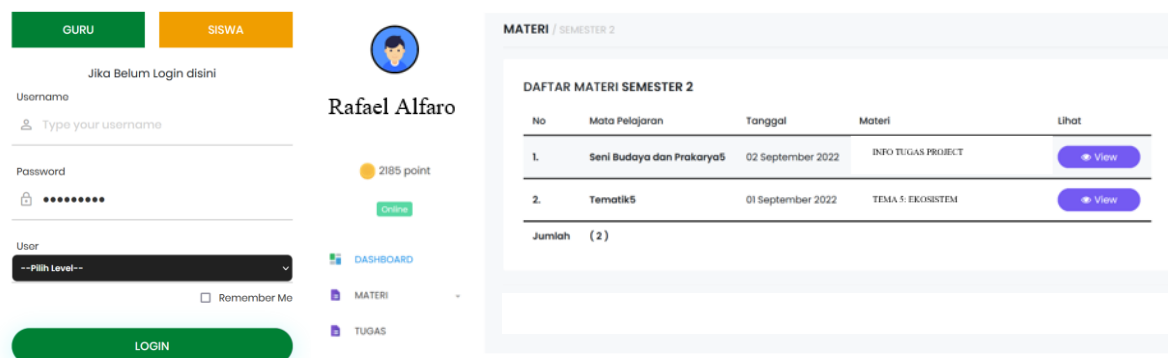


FIGURE 1: Display when logged in LMS and Lesson Materials

PjB2L learning process activities combine project-based learning and online learning, both synchronous and asynchronous. In the initial stage, the teacher gives orientation to the problem which is carried out face-to-face in class and then students construct it. Students are required to be active and creative by solving problems, finding solutions with a project, of course by collaborating between teachers and students and students with students, as well as students and parents[28]. The research findings prove that using the project-based blended learning model can improve students' academic abilities through information sharing and discussion activities where they are encouraged to be

active.[29]. Therefore the researcher wants to examine more deeply how the effectiveness of using the Ecoliteracy E-Module project-based blended learning model can improve the character of caring for the environment in elementary school.

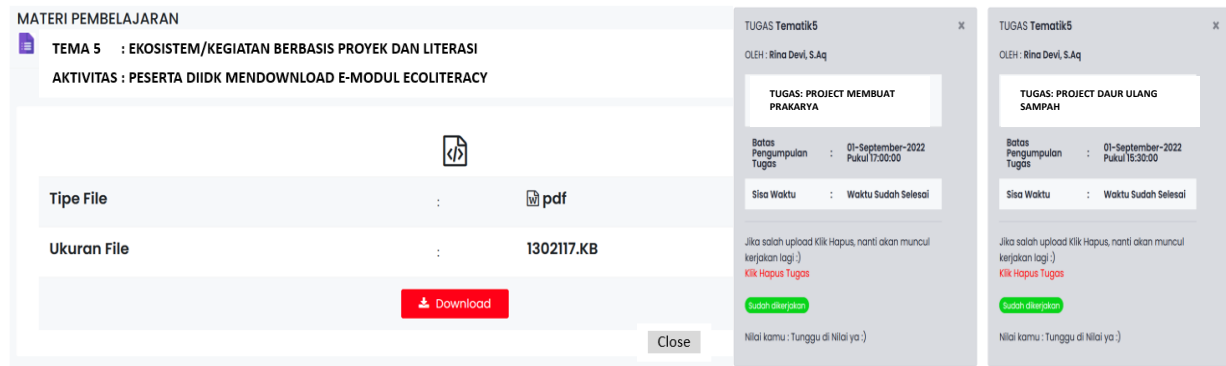


FIGURE 2: Student Activities Download E-Module Ecoliteracy

METHODOLOGY

The research used by the researcher is a quantitative experiment with a quasi-experimental research method and uses a posttest-only control design type, where the researcher cannot control all external variables that affect the course of the experiment. In carrying out this study the samples were grouped into two sample groups, namely the control class and the experimental class. The control class was given treatment using conventional methods in its learning, while the learning experimental class used a project-based blended learning model based on E-Module Ecoliteracy. The research design used is Quasi Experiment with the type of posttest-only control design which will be applied to the experimental class and the control class.

TABLE 1: Research design

Group	Treatment	Post-test
Experiment	X	O ₁
Control class	-	O ₂

Explanation:

- O₁ : Post-test in the experimental group after participating in learning using the project-based blended learning model based on the Ecoliteracy E-Module.
- O₂ : Post-test in the control group after participating in learning using conventional methods.
- X : The treatment in the experimental group was given learning using the project-based blended learning model based on the Ecoliteracy E-Module.
- : Treatment in the control group is given learning using conventional methods.

Population and Research Sample

The population in this study amounted to 58 students consisting of 30 students in the VA class and 28 elementary school students in the VB class. The sample used in this study uses the entire population. The sampling technique in this study used a non-probability sampling approach. The definition of non-probability sampling using the saturated sampling method means that 58 samples were selectedsiswa[30].

Instrument Test Analysis

Test the validity of the number of respondents 30 students and the number of questions 10 items. Based on the calculation results, it was found that the r_{table} value for 30 students or $n = 30$ at a significant level of 5% is 0.361. The

product-moment correlation coefficient value is compared to the product-moment correlation r value with $n = 30$ at a significant level of 5%, namely 0.361. The provisions in each item that are calculated to be valid are $r_{\text{count}} > r_{\text{table}}$.

TABLE 2: Validity Test Results

Classification	Number of Questions	Item Number
Valid	8	1, 2, 3, 5, 7, 8, 9, 10
Invalid	2	4, 6

Based on the table, the classification of the validity test items from the 10 questions tested contained 8 valid questions and 2 invalid questions. In this study, researchers only used 6 questions so as not to burden students with blended learning. This Reliability Test serves to determine the consistency of an instrument that can be used in any class V or in different schools with results that are not much different. This reliability test is carried out after knowing the questions that are already valid. After knowing that there are 8 valid questions, the researcher calculates the reliability test of the instrument using the Alpha Cronbach formula. Reliability serves as a measuring tool that describes the accuracy of the test takers answering the questions, the instrument is said to be reliable if $r_{\text{count}} > r_{\text{table}}$. After performing calculations using the Alpha Cronbach formula, the r_{count} value is obtained as follows:

TABLE 3: Reliability Test Results

Calculated r_{count}	r_{table} value	Explanation
0,697	$n = 30$ $\alpha = 0,05$ 0,361	$r_{\text{count}} > r_{\text{table}}$ Reliable Instrument

After doing the calculations, the results were obtained which concluded that $r_{\text{value}} = 0.697$. r_{table} at $\alpha 0.05$. $n = 30$ of 0.361. $r_{\text{count}} = 0.697 > 0.361$ r_{table} . So that the environmental care character instrument is said to be "Reliable" and is classified as very reliable and suitable for use as an assessment instrument.

Then the results of the Experimental Class Data Normality Test. After doing the calculations obtained a L_{count} of 0.1460. When compared with the Liliefors table at a significant level $\alpha = 0.05$ and $n = 30$, $L_{\text{table}} = 0.1618$ (See the table of moment product r values in Appendix 21 page 165). Thus H_0 is accepted because of $L_{\text{count}} < L_{\text{table}}$, namely $0.1460 < 0.1618$. It can be concluded that the experimental class data comes from a normally distributed population.

TABLE 4: Normality Test Calculation Results

Class	n	$L_{\text{count}} (L_o)$	$L_{\text{table}} (L_t)$	Criteria	Explanation
Control Class	28	0,1509	0,1674	$L_o < L_t$	Normal Distributed Data
Experiment Class	30	0,1460	0,1618	$L_o < L_t$	Normal Distributed Data

Next is the calculation of the homogeneity test. From the control class and experimental class data obtained, $S_{12} = 56.602$ and $S_{22} = 48.935$ with a significant level $\alpha = 0.05$ with dk quantifier = $30-1 = 29$ and dk denominator = $28-1 = 27$. Then $\alpha = (0, 05, 29, 27)$ Price $F_{\text{table}} = 1.891$.

Because F_{count} is smaller than F_{table} , namely $1.157 < 1.891$, it can be concluded that H_0 is accepted that the variances of the two groups are homogeneous.

TABLE 5: Homogeneity Test Calculation Results

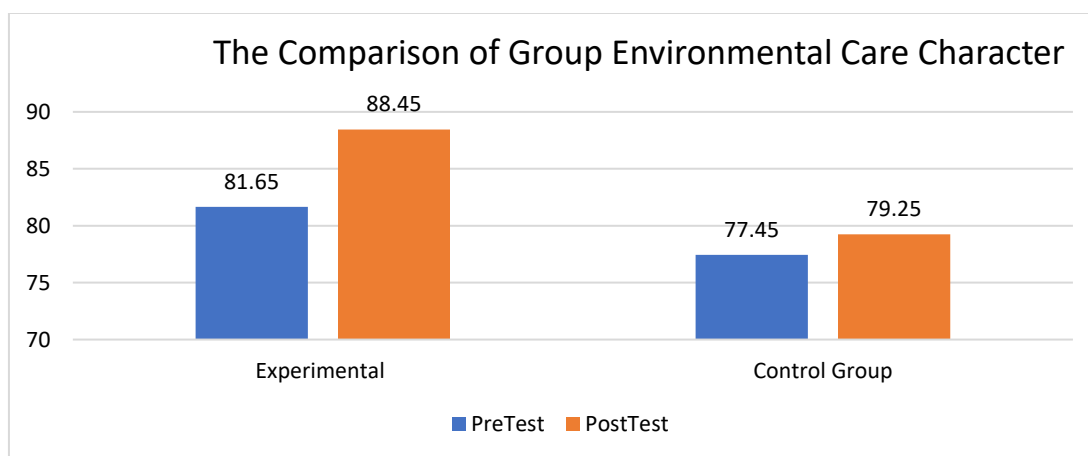
Group	n	Variant	$F_{\text{count}} (F_h)$	$F_{\text{table}} (F_t)$	Criteria	Explanation
Experiment Class	30	56,602	1,157	1,891	$F_h < F_t$	Data Sampel Homogen
Control Class	28	48,935				

Based on the calculation of the t-test in the table, it can be seen that t_{table} uses a significant level of $\alpha = 0.05$ with $dk = 58$, $dk = 58 - 2 = 56$, so the price of t_{table} is 2.003 . While t_{count} is 3.514. Then $t_{\text{count}} > t_{\text{table}}$, namely $3.514 > 2.003$. So based on the test criteria H_0 is rejected and H_1 is accepted.

TABLE 6: Hypothesis Test Calculation Results

T_{count}	t_{table}	Description
3,514	$(\alpha = 0,05),$ dk = 56, 2,003	$t_{\text{count}} \neq t_{\text{table}}$ Rejecting H_0 with the conclusion Effectiveness of using PJB2L-based Ecoliteracy E-Modules to build the character of caring for the environment of elementary school students

The average value of the pretest and posttest between the experimental class and the control class based on the graph in Figure 1.1 shows that the pretest and posttest values of the experimental class are greater than those of the control class. These results indicate that the two classes have different final abilities with a difference for the posttest of 70.40. It can be described in the graph the difference between the control class and the experimental class as follows.



CONCLUSION

Based on this research, it can be concluded that the use of the Ecoliteracy E-Module is very effective in helping elementary school students improve their environmental care character. The process of implementing learning using modules is really needed by teachers and students, especially learning using the project-based blended learning model. This model has not been widely used in elementary schools, especially in Indonesia. Many teachers have difficulty monitoring student projects, but the E-Module that students can use in blended learning can make it easier for teachers to monitor student projects. With project-based learning, it will develop students' skills, critical and creative thinking skills and be able to work together in groups, by the competency achievement of 21st-century students. The value of control class obtained an average value of 79.25 for the post-test results. While the value of the experimental class obtained an average value of 88.45. This is in line with other studies which reveal that[31]. Elementary school students are very enthusiastic about using technology for learning because they were born in an era of advanced technology. So technology-based learning or using a blended learning model is used by elementary school students quite effectively, but this cannot be separated from parental monitoring. Other research reveals that blended learning is preferred by elementary school students in the current era to produce projects[32].

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time to conduct further research related to environmentally conscious learning using a project-based blended learning model, for this reason, the researcher hopes for further research.

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21-22 Juni 2023

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