



Effectiveness of Padlet-Based Interactive Media to Increase Literacy in Environmental Change Material for Vocational School Students

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Abstract

Padlet-based interactive media can be used as a learning resource for students to increase environmental literacy. Based on the results of initial observations, it has not been optimal in linking environmental change material with environmental literacy. Students do not understand environmental literacy in a broad and global perspective. So students' environmental literacy skills are lacking. The aim of this research is to determine the effectiveness of padlet-based interactive media in increasing environmental literacy in vocational school students' environmental change material. his study uses a quantitative method.. The test subjects in this research were class X students at Al Ittihad Bringin Vocational School for the 2024/2025 academic year. The instruments used are multiple choice tests and LKPD. The results of this research are in the form of padlet-based interactive media to increase environmental literacy that is valid, easy to understand and practical. The results of the effectiveness of padlet-based interactive media in increasing environmental literacy can be seen from the N-gain value in the knowledge aspect of 0.88 in the high category, the attitude aspect of 0.82 in the high category, and the knowledge skills aspect of 0.81 in the high category. High criteria indicate that padlet-based interactive media is effective in increasing students' environmental literacy, especially in environmental change material.

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INTRODUCTION

The human population is increasing every year. The increase in population is also accompanied by an increase in problems in the surrounding environment. One of the environmental problems is evidenced by data from the National Waste Management Information System (SIPSP) of the Ministry of Environment and Forestry (KLHK) in 2022 which states that the results of input from 202 regencies/cities throughout Indonesia state that the amount of national waste accumulation has reached 21.1 million tons. Based on the total national waste production data, 65.71% (13.9 million tons) can be managed, while the remaining 34.29% (7.2 million tons) have not been managed properly. This has an impact on strengthening environmental education in the community about environmental awareness and needs to be instilled in formal education, namely to students.

Environmental education itself is an effort to provide environmental knowledge among school students. Therefore, environmental literacy education should be instilled in children at all levels of education, especially in formal education environments. The existence of environmental education can mean that if environmental knowledge increases, then human behavior in caring for the environment will also increase. Therefore, it is important to develop environmental literacy, especially in educational circles (Saitullah, 2022).

The world of education has used the term environmental literacy concept since 1969, which was confirmed by the Environment Education and Training Partnership (EETAP), which stated firmly that a person will be environmentally literate if they have awareness of the environment and know how to act towards the environment. A person's environmental literacy awareness can be measured based on environmental literacy aspect criteria, including: knowledge, cognitive skills, attitude and responsible behavior towards the environment. In this case, learning is not only the knowledge aspect that is emphasized, but thinking, affective and behavioral abilities are also the main benchmarks for the success of environmental literacy education programs (Nasution, 2016). This agrees with Nanda's (2022) research which states that environmental literacy skills in everyday life are important to apply and carry out. Not only is it important to fulfill theoretical knowledge but also non-theoretical knowledge that needs to be practiced in the surrounding environment. In essence, environmental literacy skills are able to increase insight and caring attitudes and train students on how to provide solutions to problems

that occur due to environmental change.

Environmental literacy is currently an important ability in dealing with problems that occur in the environment. In this case, it agrees with research by Susanti et al., (2024) which states that environmental literacy is a conscious attitude that a person must have which is used to maintain environmental balance. A conscious attitude towards the environment is not only having knowledge about the environment, but a person must also have a responsive attitude and be able to provide solutions to issues in the environment. Measuring a person's environmental literacy consists of four aspects, namely environmental knowledge, environmental care attitude, cognitive skills and behavior towards the environment. Instilling environmental literacy in schools can be done if students are given encouragement to master aspects of environmental literacy. To increase students' environmental literacy, appropriate material is needed as a process for increasing environmental literacy, one of which is through environmental change material.

Environmental change material is closely related to everyday human life. There are many problems that can be studied, identified and raised from these lesson materials. Apart from directly coming from the environment around students or schools, issues related to the environment are updated in magazines, newspapers or other mass media. It is hoped that environmental change material can be an intermediary for increasing environmental literacy in students. As through environmental change material, it is hoped that it will be able to educate students so that they can behave in a caring way towards the environment and have a sense of love and concern for the environment (Rosi, et al., 2022).

Based on limited interviews with vocational school teachers in the districts of Semarang and Salatiga City regarding the learning process on environmental change material, according to the science teacher's statement, environmental change material has been delivered using the lecture method with the help of media in the form of power points, but based on interviews with teachers, it is stated that they have not been optimal in linking environmental change material with environmental literacy. This is supported by students saying that the media used is quite helpful in conveying the material, but does not attract enough attention so that students easily feel bored in understanding the material. Students also said that they did not understand environmental literacy in a broad and global perspective.

One of the causes of the low level of envi-

ronmental literacy skills among students is monotonous learning media and content related to environmental literacy that is less than global. So students are less motivated in the process of receiving material related to environmental literacy skills (Sulastri, et al., 2015). Efforts that can be made include using media which can help increase environmental literacy. This is in line with the results of research by Hekmah (2019) which explains that utilizing learning media in the form of a web that is integrated with the environment can improve environmental literacy skills. Media is a tool that can help the teaching and learning process which functions to clarify the meaning of the message conveyed so that the teaching objectives can be conveyed better and more perfectly. Based on previous research, the web that was developed only contains environmental issues around students in the form of science web-LKS. Apart from that, it is known that there is no interactive learning on the web, so there is a need to develop interactive media that contains global environmental issues. One media that can be used to support increasing environmental literacy is padlet-based interactive media.

Padlet is a type of e-learning carried out by teachers and students collaboratively, reflecting, sharing links, images and other supporting features. Using Padlet media is easy to access to organize ideas and collaborate online. The advantage of Padlet media is that it can be illustrated as a virtual board and can be repeated collaboratively. Apart from that, Padlet media has various features, namely wall, canvas, stream, grid, shelf, backchannel, map and timeline so material can be combined into various categories. Developing Padlet media packaged with an attractive appearance and supported by content containing environmental literacy in environmental change material which aims to make it easier for students to understand environmental literacy (Testiani, et al., 2022). This is in line with Viberg et al., (2021) that the Padlet application can be a very interactive class assessment tool. Apart from that, Padlet media is very easy to learn so that students can easily operate it. Padlet can be operated via smartphone, tasblet, laptop and computer.

Vocational School was because only a few of the previous studies conducted research at the Vocational School, apart from that the researchers also considered the majors at the Al Ihtitah Vocational School, namely Agribusiness, Food Crops and Horticulture. Therefore, this research is entitled Development of Interactive Media Based on Padlet to Increase Environmental Literacy in Environmental Change Material for

Vocational School Students. The purpose of this study is to obtain the characteristics of interactive media based on padlet to improve environmental literacy on environmental change material that is developed to be interactive and interesting. The interactive media based on padlet that is developed is valid and practical to be used as a learning medium for environmental change material. Interactive media based on padlet can improve environmental literacy skills in students.

METHOD

This study uses a quantitative method. The form of research design used is Pre-Experimental with the type of One Group Pretest-Posttest Design. The method used in this study is a quantitative research method that describes the details of data collection and analysis to measure the effectiveness of interactive media based on Padlet to improve environmental literacy. The form of research design used is Pre Experimental with the type of One Group Pretest-Posttest Design. Pre Experimental Design is a study by observing a main group and conducting interventions throughout the study. In this design there is no control group to compare with the experimental group (Agustina, 2020).

Table 1. One Group Pretest-Posttest Design Research Design

Pretest	Treatment	Posttest
O_1	X	O_2

This research is a development research, where data is obtained from the results of needs analysis, validation by material experts, media experts, responses from teachers and students as users also effectiveness of media use on students' environmental literacy. The calculation of the level of validity of the test used following formula:

$$r_{xy} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{[N \sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]}}$$

Information:

r_{xy} = Product moment Coefficient

N = Number of samples

X = Item Score

Y = Total Score

The analysis of Padlet can be calculated using the formula below.

$$<N\text{-gain}> = \frac{S_{post} - S_{pre}}{S_{max} - S_{pre}}$$

Explanation:

<N-gain> = Environment literacy values

S_{pre} = Pre-test Score

S_{post} = Post-test Score
 S_{max} = Maximum Score

The level of environment literacy in Table 2.

Table 2. Level of Science Literacy Ability

Score	Criteria
$0.7 \leq g \leq 1$	High
$0.3 \leq g < 0.7$	Medium
$0 < g < 0.3$	Low

RESULT AND DISCUSSION

The characteristics of interactive media based on padlet to improve environmental literacy that are developed can be accessed online with a display in the form of a website or application that contains environmental literacy on environmental change material. Characteristics include a padlet wall containing learning materials in teaching modules, problem solving, creative activities and environmental literacy LKPD. Equipped with YouTube videos, edugame quizzes, and article links related to global environmental literacy as well as student activities that can respond to each layout on the padlet wall. So that it has interactive properties and an attractive appearance to improve students' environmental literacy. This is in accordance with the opinion of Cahyo (2022) that Padlet media can provide information repeatedly, so that students can re-learn the material that has been given by the teacher.

The results of the media expert validation were declared valid with an average score of 92% and the results of the material expert validation obtained an average score of 90%. This is in line with the results of the study Qoimatu (2022) which stated that the results of the Padlet media validation test on wave and sound material based on media experts averaged 88% and material experts averaged 96% with a very valid category.

The results of the practicality test obtained an average teacher response of 91.09% with a very practical category and the average student response results obtained results of 89.04% with a very practical category. This is in line with research (Alghozali, 2021) which states that the use of padlet media is stated to be very practical through a teacher response questionnaire with an average result of 92.59% and a student response questionnaire with an average result of 91.35%.

The ability to increase students' environmental literacy using Padlet-based interactive media on environmental change material was

measured using pretest and posttest questions. The questions used are based on a grid consisting of learning outcomes, learning objectives, materials used, environmental literacy indicators. The number of pretest and posttest questions was 25 multiple choice questions, the pretest posttest questions were done by class In this study, 2 classes were used, X ATPH 1 and X ATPH 2 with a total number of students, namely 55 students. data from the pretest posttest comparison results can be seen in Table 1.

Table 1. Results of Environmental Literacy Analysis Based on Overall Data

Pretest	Posttest	N-Gain	Criteria
48.65	92.72	0.85	Tall

Based on the results of environmental literacy analysis by analyzing the overall data from the pretest posttest results, an N-Gain score was obtained, namely 0.85 with high criteria. This shows that using padlet-based interactive media to increase environmental literacy can be said to be effective for use in learning environmental change material.

The effectiveness of using padlet-based interactive media to increase environmental literacy was also calculated based on the environmental literacy aspect, which consists of 2 aspects, namely; (1) knowledge aspect (knowledge), (2) attitude aspect (attitude). The results of the pretest posttest analysis based on environmental literacy aspects can be seen in Table 2.

Table 2. Analysis results based on aspects of environmental literacy knowledge and attitudes

Aspect	Value			
	Pretest	Posttest	N-Gain	Criteria
Knowledge	44.39	93.78	0.88	Tall
Attitude	52.58	91.74	0.82	Tall

The effectiveness of using padlet-based interactive media to increase environmental literacy was also calculated based on the cognitive skills aspect which was measured using LKPD questions. The results of the pretest posttest analysis based on aspects of environmental literacy on cognitive skills can be seen in Table 3.

Table 3. Analysis results based on cognitive skills aspects

Pretest	Posttest	N-Gain	Criteria
54.09	91.36	0.81	Tall

Data from the students' pretest and posttest results were analyzed based on the environmental literacy aspects presented in Tables 2 and 3. Based on the results of the environmental literacy analysis, an N-Gain score was obtained of 0.88 in the knowledge aspect in the high category. The knowledge aspect has the highest increase or N-Gain. The results of the environmental literacy analysis on the attitude aspect obtained an N-Gain score of 0.82 in the high category, and the results of the environmental literacy analysis on the cognitive skills aspect obtained an N-Gain score of 0.81 in the high category. Increasing environmental literacy can also be demonstrated based on the results of activities on Padlet interactive media which is packaged with various features and materials presented. One of them is through the use of educational games found on the padlet walls, so that students can practice and work on questions packaged based on aspects of environmental literacy so that they can foster enthusiasm in practicing environmental literacy skills.

Increasing environmental literacy in padlet-based interactive media on environmental change material can be shown on the pages on the padlet wall, which include teaching modules in which there are practice questions based on case studies on environmental problems and evaluations in the form of wordwall and baamboozle game quizzes. The explanation of environmental literacy to measure the achievement of increasing environmental literacy in the aspects of knowledge and attitudes includes the explanation of environmental change material and practice questions contained in the teaching module act as knowledge aspects of knowledge. There is a picture of the environmental problem of piling up rubbish contained in the problem solving activity on the padlet wall. Students can provide responses regarding attitudes that must be taken to overcome this problem, acting as an attitude aspect. Practice questions can be done independently by providing instructions on how to do them, making it easier for students to study independently (Daryanes & Ririen, 2020; Lauc et al., 2020).

Evaluation in the form of a quiz game has interactive activities given to students. In the media developed, there are several quiz games, consisting of wordwall and baamboozle, each of which has its own role, namely when using the wordwall quiz game, students will practice independently to work on the questions that have been provided, then for the quiz game via baamboozle, students will be divided into two groups or teams to discuss answering the questions on the baamboozle game board, each team will choose

a number from the game board and then answer questions from the questions that have been selected, if the answer is correct, then the team gets points, and the team that gets the most points at the end of the game is the winner. The quiz game platform through baamboozle has the benefit of helping students learn in an interesting, exciting way, helping students to absorb and remember information easily, and students can develop themselves to improve their way of thinking through the questions that have been provided. The evaluation in the form of a quiz game has been packaged by providing practice questions that include aspects of environmental literacy, namely knowledge and attitude. The results of these activities are a benchmark for the extent of students' environmental literacy skills. The quiz game contains multiple choice questions with a time limit to answer, so that students become more active in thinking quickly in applying concepts and solving problems from the questions presented.

Quiz game activities through padlet-based interactive media will further help teachers in increasing student involvement because this activity is able to liven up the classroom atmosphere through increasing student participation, besides that students will more easily understand environmental literacy through environmental change material presented in various forms of activities on the media developed. This is in line with research (Mazelin et al., 2020) which states that quiz games can enable students to participate actively in giving opinions and being directly involved in class discussions. So that students feel more comfortable and motivated to join in learning.

CONCLUSION

Based on the results of research and data analysis, it can be concluded that Padlet-based interactive media that has been developed is learning media with a website platform display that is packaged interactively through the elements studied, namely to increase environmental literacy in environmental change material. The characteristics of the Padlet-based interactive media developed are that it has a virtual wall display which contains a collaboration between text, images, videos, teaching module material, article links, quiz games and LKPD. Padlet-based interactive media to increase environmental literacy can be seen from the N-gain value in the knowledge aspect of 0.88 in the high category, the attitude aspect of 0.82 in the high category, and the knowledge skills aspect of 0.81 in the high category. High criteria indicate that padlet-based interactive media

is effective in increasing students' environmental literacy, especially in environmental change material.

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