Interactive Multimedia Inquiry Based on Local Wisdom: Alternative Media to Improve Students' Environmental Care Attitude

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Abstract

The students' environmental care attitude is still low. One of the factors that cause environmental damage is the lack of awareness of students in the importance of disposing of waste in its place and knowledge in managing waste. In addition to the problem of students' environmental care, learning in schools is also still rarely associated with learning materials with the surrounding environment (local wisdom). The research aims to develop an interactive multimedia inquiry that integrates practical and effective local wisdom to improve students' environmental care attitudes. This research is a development research using a 4D development model. The environmental care attitude questionnaire instrument was developed referring to 4 indicators, namely: maintaining class cleanliness, maintaining school cleanliness, developing empathy for all forms of life and maintaining plants at school. Data collection techniques using a questionnaire instrument. The practicality data analysis technique uses practicality percent and the effectiveness of interactive multimedia inquiry is analyzed using normalized gain. The results showed that the teacher's response to multimedia products was categorized as good because it was in accordance with learning needs by utilizing technology. Students' responses to multimedia are categorized as good because the tasks given are in accordance with the experiences of students in both the social and school environment. Based on the results of the analysis of the effectiveness test, it showed that the experimental class taught using interactive multimedia inquiry based on local wisdom obtained an increase in environmental care attitudes which was higher than the control class taught without using interactive multimedia based on local wisdom, it obtained an increase with moderate criteria. Based on this description, it can be concluded that interactive multimedia inquiry based on local wisdom is practical and effective to improve students' environmental care attitudes.

Keywords: Inquiry interactive multimedia, environmental care attitude, local wisdom

INTRODUCTION

Today's global environmental conditions are increasingly concerning (Susanti, et al., 2017; Stevanus, 2019). The students' environmental care attitude is still low. The results of Azmi and Elfayetti's research (2017); Narut and Nardi (2019) stated that students' environmental care attitudes were still low due to several factors, one of which was the intention to know and study environmental problems. One of the factors that cause environmental damage is the lack of awareness of the importance of disposing of waste in its place and knowledge of managing waste (Rahman, et al., 2020). People often see littering if they don't find a trash can (Sidiq, 2020). The activities of disposing of waste and sorting waste according to the type of waste seem trivial, but the impact of these habits is very large if applied properly and continuously (Siskayanti & Chastanti, 2022).

Teachers as educators must inform and realize that an understanding of the environment must be the basis of attitudes to be able to solve environmental problems

(Zsoka, et al., 2013). To support students' concern for the environment, through educational institutions, it is necessary to provide an understanding of the importance of preserving the environment (Fitriati, et al., 2019). A complete understanding of the environment is expected to change the behavior of students to be more concerned about the surrounding environment (Horton, et al., 2017). Inculcating the values of caring for the environment can be done through classroom learning. In addition to the attitude of students' concern for the environment, classroom learning must also be able to relate the material to the surrounding environment (local wisdom).

Learning based on local wisdom can instill values and norms in every student (Siskayanti & Chastanti, 2022). This can provide encouragement and motivation for students to study at school and can also be implemented in social life (Stevanus, 2019). But the fact is that science learning based on local wisdom is still rarely done in Indonesia (Shidiq, 2016). Furthermore, Andayani et al (2020) stated that the understanding of teachers in Lombok about local wisdom is quite good but they have not been able to integrate this knowledge optimally in science learning. This shows that there are obstacles faced by teachers in an effort to integrate local wisdom in learning. In addition to the need for sufficient knowledge, teachers also need to have adequate experience related to local wisdom that is around them in order to better recognize and participate in preserving the potential of existing local culture (Wardani, 2021). Skills in developing learning tools based on local wisdom are also an important factor in efforts to integrate local wisdom in learning, and the fact is that teachers still experience difficulties in developing these tools.

According to Rani and Nuryanti (2019) the developed ecohistory-based photographic multimedia can foster students' environmental caring character, however there are several suggestions for improving multimedia, namely in terms of multimedia display and the addition of more complete photography-related material. In addition, Nugroho and Surjono (2019) stated that interactive multimedia on PPKN material developed was feasible and effective for increasing students' love for the motherland and environmental care attitudes.

One alternative to overcome these problems is to use interactive multimedia, integrated inquiry, character education oriented to local wisdom as a learning medium. The use of interactive multimedia as a learning medium can be an alternative as well as a solution to make students more active in the learning process (Ramdani, et al., 2020). The development of interactive multimedia using the inquiry learning model. Inquiry learning is a learning model that has the ability to equip students with the skills to make discoveries, through problem solving activities. According to Ramdani and Artayasa (2020) this learning model is very suitable for students in Indonesia. Ramdani, et al (2021), also stated that inquiry is an activity of seeking information, raising problems, and conducting investigations. The research aims to develop an interactive multimedia inquiry that integrates practical and effective local wisdom to improve students' environmental care attitudes.

METHOD

This research is a development research using the 4D development model developed by Thiagarajan (1974). The subject of a limited trial was carried out on 70 grade VIII students in one of the junior high schools on the island of Lombok. This study used 2 classes consisting of 1 experimental class and 1 control class. The experimental class was taught using multimedia inquiry based on local wisdom while the control class was taught without using (conventional) multimedia.

The environmental care attitude instrument used is a questionnaire which refers to indicators of maintaining classroom cleanliness, maintaining school cleanliness, developing empathy for all forms of life and caring for plants at school (Riskiana & Lystianingsih, 2019). The technique of collecting data on the practicality of learning was obtained from teacher and student response questionnaires related to learning using inquiry-based interactive multimedia based on local wisdom. Effectiveness data was obtained by using a questionnaire

instrument. The self-assessment questionnaire instrument sheet consists of 31 statement items with a minimum ideal score = 0 and an ideal maximum score = 4. The average score of students' environmental care attitudes is categorized into four categories according to the Ministry of Education and Culture, namely; invisible (BT), visible (MT), growing (MB), and rooted (MD) (Center for Policy Analysis and Synchronization, 2017). Analysis of the data to determine practicality obtained the percentage of practicality, then data analysis of the effectiveness of interactive multimedia inquiries based on local wisdom using the N-gain test according to Hake (1999).

RESULTS AND DISCUSSION

The final model from the development stage is an interactive multimedia inquiry based on local wisdom as a source of learning media that can be accessed by teachers and students as a support in learning activities. This multimedia product is packaged in the form of an application. The multimedia feature component consists of a home menu, instructions for use, learning materials, quizzes, animations, inquiry activities, local wisdom, summaries, references, and media developer profiles. The multimedia feature components developed have specifications by combining elements of images, audio, video, and learning animations without the need to use internet access.

Inquiry interactive multimedia based on local wisdom was developed using Adobe Flash CS6. This multimedia was developed based on the flowcharts and storyboards that have been made. Flowcharts are arranged as illustrations to facilitate the process of making interactive multimedia inquiry. At this stage, supporting materials such as hosting and domains, images, background creation, videos, sound effects, button icons, and learning animations related to the digestive system are collected. Some of the multimedia displays that were developed are presented in Figure 1-2.
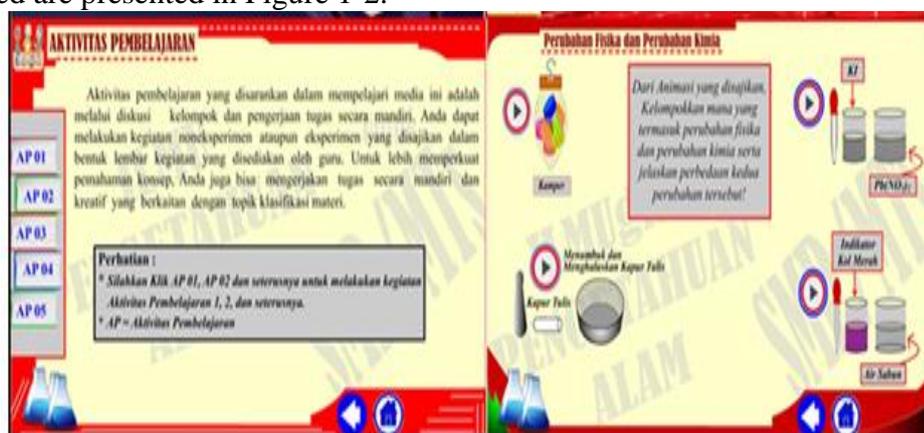

Figure 1. Inquiry activity
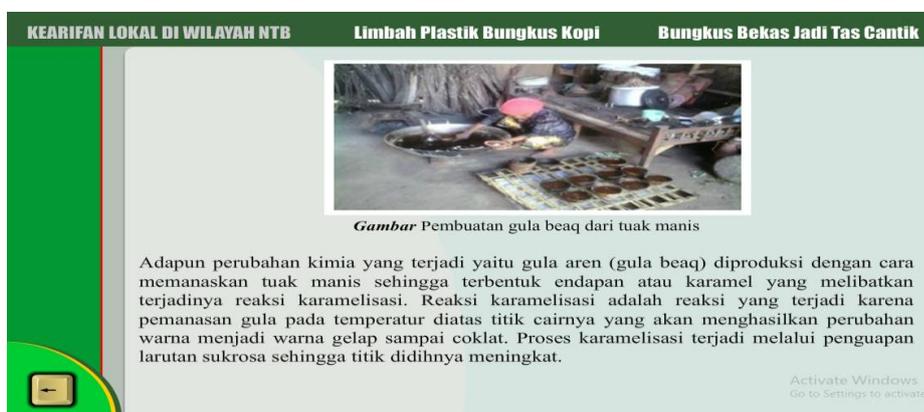
Figure 2. Studies related to local wisdom

Practical learning

The practicality of learning was obtained from student and teacher responses to the use of multimedia inquiry based on local wisdom. The results of the analysis are presented in Figure 3.

**Teacher and student responses to the use of multimedia**
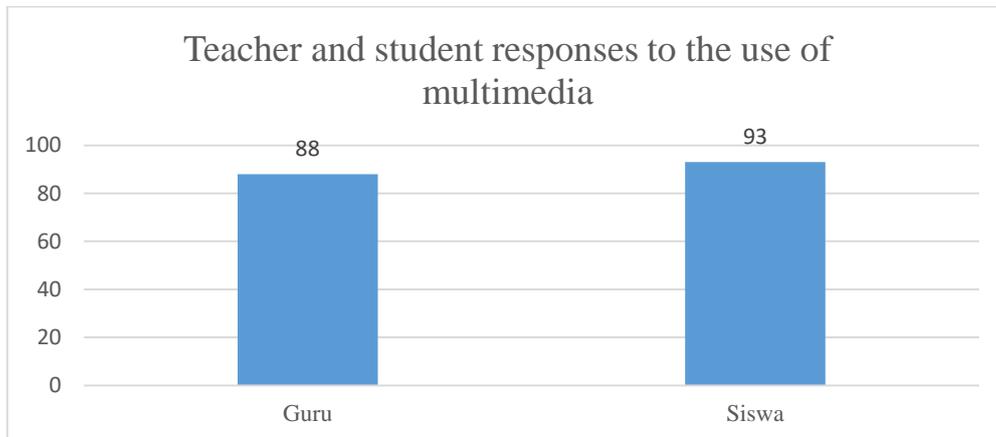
Figure 3. Results of teacher and student responses to the use of multimedia inquiry

Based on Figure 3, it shows that the teacher's response to multimedia products is categorized as good because it is in accordance with learning needs by utilizing technology. Students' responses to multimedia are categorized as good because the tasks given are in accordance with the experiences of students in both the social and school environment. Learning activities emphasize more on the activities of students in using problem-solving strategies for the problems presented. Learning activities in the classroom are presented in Figure 4-6.

Figure 4. Learning using multimedia inquiry

Figure 5. Making a wall magazine related to the material of the digestive system in humans
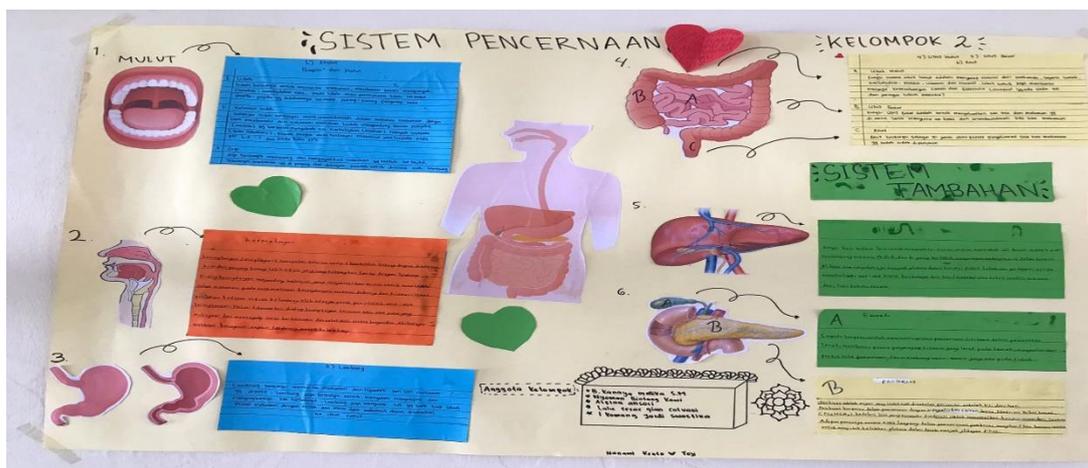
Figure 6. Student activity results

Learning effectiveness

The effectiveness of learning is obtained from the results of the questionnaire analysis of students' environmental care attitudes using the N-gain test. The results of the analysis are presented in Table 1.

Table 1. N-Gain Results of Students' Environmental Care Attitude

Class	Average		Average N-Gain (%)	N-Gain criteria
	Pre-Test	Post-test		
Experiment	21	78	72	High
Control	29	65	69	Moderate
Average			**70.05**	**High**

Based on Table 1 shows that the experimental class obtained an average score with high criteria, while the control class obtained an average score with moderate criteria. This shows that learning using multimedia inquiry based on local wisdom can increase environmental care attitudes compared to the control class that learns without using interactive multimedia.

The difference in the attitude of caring for the environment is also caused by the learning process of the control class which is taught by conventional methods and the experimental class which is taught by inquiry-based interactive multimedia. The learning process in the experimental class consists of five phases, namely; (1) problem orientation, the teacher gives the problems contained in the multimedia around the problem of environmental pollution in the surrounding environment including forest fires, accumulation of garbage in the school environment, and school fish ponds where there is a lot of garbage. At this stage, students are asked to solve problems in multimedia individually. The problems given are problems that are close to everyday life and are felt by the students themselves. The results of students' answers in solving problems in the problem orientation phase are good; (2) The phase of organizing students to study, where students are asked to study environmental pollution material and present the results of their answers in their respective groups; (3) The phase of guiding individual/group experiences, students work together to agree on the results of the discussion, provide answers from the problem solving process and design a work in the form of a poster calling for environmental care; (4) The fourth phase presents and develops the work, students in groups present their work in the form of discussion reports and posters asking for environmental care in front of the class; (5) The phase of evaluating the problem solving process, the teacher and students evaluate the answers to the problem solving process given. The teacher reinforces some of the answers to the questions raised during the presentation, and briefly discusses the answers to the multimedia that has been presented.

Furthermore, the teacher re-emphasized about always taking care of the surrounding environment.

In the experimental class students get new knowledge about how to prevent environmental damage in the form of moral knowledge that is used to make decisions in behaving and behaving towards the environment. Students get real problems that are felt in everyday life and these problems must be solved together with the group so that each student can develop a solution through various ways of data collection and discussion. So by learning to use interactive multimedia students are not just to receive theory and remember, but students act as seekers of solutions to environmental problems that exist around them. Besides being presented with ways to protect the environment, multimedia is also facilitated with phenomena related to local wisdom. Such as how to make brown sugar from sugary palm wine and readings related to the abundant salt in Lombok.

Learning in the control class, students were asked to explain more about the material that had been delivered by the teacher in the form of working on questions. In the learning process the teacher explains the overall material to be discussed, then students are asked to discuss with their classmates to write down examples of sources of environmental pollution including air, water and soil pollution, impacts and efforts to overcome them. Based on the observations, the students were quite enthusiastic in listening and listening to the teacher's explanation. However, students tend to be passive in asking questions when asked by the teacher and in group presentations. This is in accordance with the opinion of Susanti, et al. (2017) that in the conventional method students are passive recipients of information, where students receive knowledge from the teacher and knowledge is assumed to be a body of information and skills according to standards. In addition, conventional methods lead to less interaction among students. This is because the teacher is more dominant in the learning process.

The selection of multimedia inquiry based on local wisdom is seen as suitable with the current curriculum development. Inquiry multimedia learning media based on local wisdom can empower students' environmental care attitudes. This is because the average value of students' environmental care attitudes is still low, only in the visible category before using inquiry multimedia learning media based on local wisdom. The development of multimedia inquiry based on local wisdom in empowering environmental care attitudes received a very good response by students. Rumengan and Talakua (2020) state that through learning using learning facilitates interaction between students and subject matter/materials. Students can share information or opinions on various matters relating to lessons or the needs of students' self-development. In addition, teachers can place learning materials and assignments that must be done by students in certain places on the web for students to access. According to needs, teachers can also provide opportunities for students to access certain learning materials and exam questions that can only be accessed by students once and within a certain time span. The use of multimedia inquiry based on local wisdom makes students interested in learning. This causes students to clearly understand how the environment is and how to maintain and care for the environment around them.

Arkorful and Abaidoo (2015) define media as multimedia and internet technology used to improve the quality of learning by increasing access to resources and services as a guide in information sharing and collaboration. Inquiry multimedia based on local wisdom offers educators and students a new way to expand their teaching-learning experience by providing a virtual environment that allows them not only to transmit but also to investigate and apply information, and to promote new knowledge. Learning science using android media integrated with local wisdom using an inquiry learning model.

Kauchak & Eggen (2012) explained that the application mof the inquiry model in the learning process includes five activities or learning phases. Based on these phases, the third phase is the exploration phase. This phase can apply learning that emphasizes the interaction between educators and students or students with other students. Based on this opinion, the

inquiry model is applied as a supplement to help facilitate students in learning and accessing information. Besides being able to improve students' environmental care attitudes, the development of multimedia inquiry based on local wisdom can improve students' higher-order thinking skills. This is because in multimedia it has been facilitated with indicators of higher-order thinking skills, besides that there is the concept of local wisdom along with strengthening character education. This step aims to train students to think at a higher level and care about the surrounding environment.

According to Wartono and Nilasari (2019) students are very enthusiastic about real-based virtual learning using the inquiry learning paradigm because they feel that their learning is very interesting. Learning that is often carried out in schools is generally conventional or one-way (Ramdani, et al., 2020). Students believe that computer-based learning, including animation, computer simulations, and real experiments, helps them understand concepts more clearly. In addition, it stimulates a constant desire to learn (Chin, et al., 2015). When learning through the media, children are now actively seeking information, identifying problems, and solving them instead of the teacher.

Hadisaputra, et al (2019) believe that interactive multimedia is one of the media that can use gadgets in the form of digital applications, which supports the findings of the research that has been done. Digital applications contribute significantly to the application of didactic principles and the achievement of educational goals.

The teaching and learning process that is supported by multimedia attracts students and the correct conception of creation. Students prefer to learn something that is facilitated by animation than facilitated by other representatives (Hwang, et al., 2016; Gunawan, et al., 2021). Theoretically, animation is more effective for depicting dynamic movements or processes (Ismail, et al., 2016).

CONCLUSION

Based on the results of the study, it can be concluded that interactive multimedia inquiry based on local wisdom is practical and effective to improve students' environmental care attitudes. This is because multimedia has been facilitated with the concept of local wisdom along with strengthening character education. This is done to train students to care about the surrounding environment.

RECOMMENDATION

Inquiry-based interactive multimedia integrated with local wisdom that was developed practically and effectively used in learning. The resulting interactive multimedia can be an alternative learning resource used by teachers in teaching, especially in science learning. The multimedia developed is also only on material on the human digestive system.

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