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THE EFFECTIVENESS OF USING INTERACTIVE VIDEO LEARNING MEDIA OF THE DIGESTIVE SYSTEM TO SUPPORT QUALITY EDUCATION OF SUSTAINABLE DEVELOPMENT GOALS (SDGs)

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Abstract

Quality education is one of the main goals of the Sustainable Development Goals (SDGs) initiated by the United Nations. In the digital era, the use of technology in learning is important to improve the quality of the process and learning outcomes of students. This study aims to determine the effectiveness of interactive video learning media about the digestive system based on project learning to support quality SDGs education. The research method with a quantitative approach with an experimental research design, using a research design, namely the pre-test post-test design of one group. Samples were taken randomly totaling 34 students and representing the population of class XI SMA Swasta Taman Siswa Binjai, North Sumatra, Indonesia. The data was tested using the N-Gain test to obtain effectiveness results using SPSS 25. The results obtained were effectiveness in the high category with a score of 0.8090, which means that learning that utilizes interactive video media based on projects on the digestive system material is able to achieve a learning success rate of up to 80.9%.

Keywords: Effectiveness; Learning media; Project based learning; SDGs education

Abstract

Pendidikan berkualiti adalah salah satu matlamat utama Matlamat Pembangunan Mampan (SDG) yang dimulakan oleh Pertubuhan Bangsa-Bangsa Bersatu. Dalam era digital,

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penggunaan teknologi dalam pembelajaran adalah penting untuk meningkatkan kualiti proses dan hasil pembelajaran pelajar. Kajian ini bertujuan untuk mengetahui keberkesanan media pembelajaran video interaktif tentang sistem pencernaan berdasarkan projek untuk menyokong pendidikan SDG yang berkualiti. Kaedah kajian dengan pendekatan kuantitatif dengan reka bentuk kajian eksperimen, menggunakan reka bentuk kajian iaitu reka bentuk ujian pra ujian pasca satu kumpulan. Sampel diambil secara rawak berjumlah 34 orang pelajar dan mewakili populasi kelas XI SMA Swasta Taman Siswa Binjai, Sumatera Utara, Indonesia. Data diuji menggunakan ujian N-Gain untuk mendapatkan keputusan keberkesanan menggunakan SPSS 25. Keputusan yang diperolehi adalah keberkesanan dalam kategori tinggi dengan skor 0.8090, bermakna pembelajaran yang menggunakan media video interaktif berdasarkan projek pada bahan sistem pencernaan mampu mencapai kadar kejayaan pembelajaran sehingga 80.9%.

Kata kunci: Keberkesanan; Media Pengajaran; Pembelajaran berasaskan projek; SDGs pendidikan

1.0 INTRODUCTION

In the current era of globalization, it is very developed, including in the world of education. Digitalization in the Merdeka Curriculum refers to the integration of digital technology in the learning process in accordance with the principles of the Merdeka Curriculum. The goal is to support more flexible learning, centered on students, and encourage the development of 21st century character and competencies, including in the field of education. Therefore, it is necessary to develop learning media that utilize current advances in technology and science so that access to information for students becomes easier and more interesting.

Learning media plays a role as an important component in the learning process and greatly influences the smoothness of the learning process, which is able to affect students' cognitive learning outcomes. Interesting and innovative learning media will encourage students to think creatively and better understand what is being taught during didactic lectures, for example via lectures or structured lessons.

Current developments in the world of education, such as its integration with digitalization. Today are challenges that continue to change and develop along with time and technology. This development must be managed by educators who meet the right standards so that it can be used in the development of science and technology-based education.

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Media can also be interpreted as a medium that can attract students' attention so as to arouse students' learning motivation (Rahmawati, 2019). Education must adapt to technological advances to create learning methods that are more creative, interactive, and relevant to the needs of today's students. The existence of technology is currently considered very important in human life as a support in carrying out various activities both in daily-work and in terms of education (Lailan, 2024).

Technology can be a bridge to change the learning process to be more dynamic, by utilizing digital media such as videos, interactive simulations, and online learning platforms that provide space for students to learn independently and collaboratively (Waruwu et al., 2024). Thus, technology-based education prepares students to face the challenges of an increasingly complex and technology-based world of work.

In teaching and learning process, the concept of scientific literacy is lacking for the educators, hence resulted in limited right learning media from the teachers to build and hone students. The media used by the students are students-guided and teacher-guided books which are provided by the government, as well as simple materials made by the students themselves.

The results of observations before the research was conducted in SMA Swasta Taman Siswa Binjai, it was found that teachers are still conventional and lacking or limited utilization of the technology in this globalization era. However, short learning duration and technological skills prevent teachers from implementing supporting media in the teaching and learning process.

Teachers are required to be educational innovators who can create and develop innovative, creative, and interesting learning media. So that it can be accessed flexibly anytime and anywhere, and the learning process can encourage active involvement, learning independence, and continuous improvement of learning outcomes.

The need to change elements in the learning structure is the application of learning media that uses animated videos to provide solutions to overcome the limitations of students' experiences. Previous research has shown that technology such as learning videos has great potential to increase student motivation and help them understand the material better (Agustini, Nugraha & Hanifah, 2024).

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The existence of quality education is expected to be a means of being an 'agent of change' for the younger generation, but also as an 'agent of production' in order to create real transformation for the progress of a nation (Safitri, Yunianti & Rostika, 2022). Learning material products can be produced from project-based learning. Project-Based Learning (PjBL) is a project-based learning model, where the learning process is designed through authentic and produce products (Erungan, Paat & Pajung, 2023). So that students have space to express creative and innovative ideas by trying new things through the project work they do. For this reason, students are required to be more active and educators act as facilitators (Juwanti et al., 2020).

The global era demands an adaptive and transformative education system, while SDG goal 4 (quality education) provides clear direction and goals for inclusive, quality, and relevant education. Education is an important bridge to ensure that future generations are able to compete globally while becoming agents of sustainable development, namely ensuring the quality of inclusive and equitable education and increasing learning opportunities for all levels of society (Amin et al., 2020). The implementation of education based on SDGs is a new challenge to build a quality and globally competitive education system (Ardhiya et al., 2022). This study aims to determine the effectiveness of using interactive video learning media about the digestive system based on projects to support SDGs of quality education. This study offers an innovative solution by designing low-tech learning media that remains effective, contributing to the inclusiveness of education in the digital era.

2.0 MATERIALS AND METHODS

First, students answered a pre-test in the form of multiple choice questions, then a digestive system learning was held with interactive video media, after the material was taught, students worked on a project assignment to make a digital poster product about the digestive system and healthy food consumption, this study lasted for 3 weeks, then at the end of the meeting students answered the post-test questions.

Data Collection:

Student learning outcomes were measured using standardized test instruments. The data from pre-test and post-test scores were analyzed using statistical methods.

Sample and Participants:

A random sample of 34 students was obtained, representing the population of class XI of class

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XI students of SMA Swasta Taman Siswa Binjai. Its implementation in various learning activities, including pre-test and post-test.

Experiment Procedure:
Preliminary study was conducted to identify problems in the teaching and learning process of biology, especially regarding the digestive system topic.

Media Development:
Interactive video learning media was developed based on project-based learning (PjBL) principles. The media includes visual explanations, narration, interactive features and project assignments to engage students in deeper learning.

Expert Media Validation:
The developed media was validated by subject matter experts and media experts to ensure the accuracy of content, clarity of presentation, and alignment with learning objectives and the PjBL model. Revisions were made based on expert feedback.

Implementation Media:
The media is applied in the classroom. This study involved an experimental class (using interactive video media project-based learning approach), lecturers assisted by students in the project-based learning process.

2.1 Data Analysis

This study used a quantitative approach with an experimental research design. Using a research design, namely one-group pre-test-post-test design.

Design of One Group Pre-test – Post-test:

$$O1 \rightarrow X \rightarrow O2$$

Information:
O1: Pre-test score (before treatment)
X: Treatment
O2: Post-test score (after treatment)

The data collection technique used in this study was a learning outcome test. The learning outcome test is used to measure the level of student learning outcomes in the

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cognitive domain through initial and final tests. The data obtained were tabulated into a diagram. Furthermore, the data results were tested with the N-Gain test to obtain effectiveness results using SPSS 25.

The N-Gain value categories used as benchmarks are as follows:

$g > 0.7$ = high
$0.3 \leq g \leq 0.7$ = moderate
$g < 0.3$ = low, (Meltzer, 2002).

3.0 RESULTS AND DISCUSSION

3.1 Interactive Video

This interactive video is a learning medium designed to help students understand the concept of the human digestive system through a project-based learning approach. It is presented in the interesting way with a combination of educational animation, interactive simulations, and reflection quiz, this video also challenges students to develop creative projects as a form of applying their knowledge, as seen in Figure 1.

Figure 1: Initial view of learning video media

This video media presents material visually while activating student participation through various interactive features. In the process, students are involved in completing a project in the form of an educational campaign that highlights the importance of maintaining a healthy digestive system, as seen in Figure 2.

Through this media, students trained to understand the structure and function of human digestive organs, analyze factors that affect digestive health, develop critical thinking skills, creativity, collaboration, and communication.

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Interactive video media can convey material visually and actively involve students, as well as support the achievement of the values contained in the Sustainable Development Goals. Specifically, this activity is in line with SDG 4 (Quality Education) because it encourages innovative, participatory, and student-centered learning models, thereby increasing students' understanding and critical thinking skills.

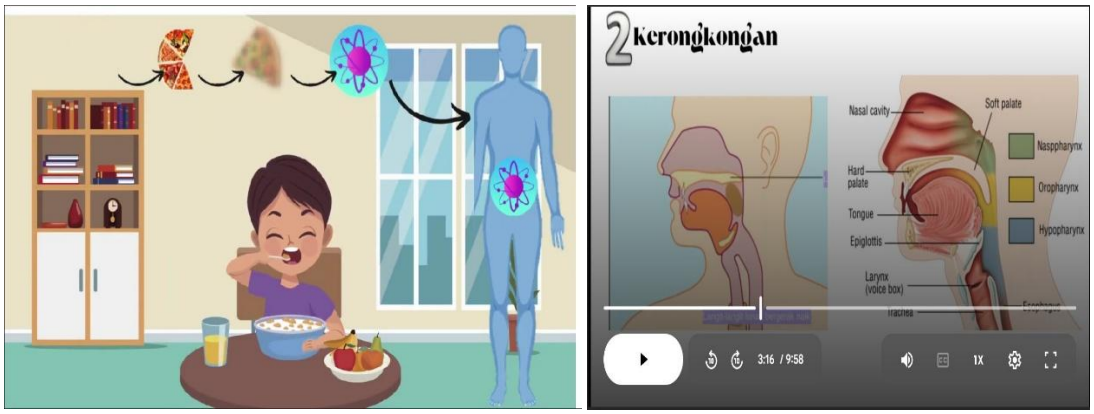

Figure 2: Digestive system content

In addition, it also supports SDG 3 (Healthy and Prosperous Life) because it emphasizes the importance of maintaining digestive health through education. In other words, this educational campaign project in video media can improves students' academic competence, also forms a caring and responsible character towards their own health. This can be improved by assessing questions in the quiz section, as can be seen in Figure 3.

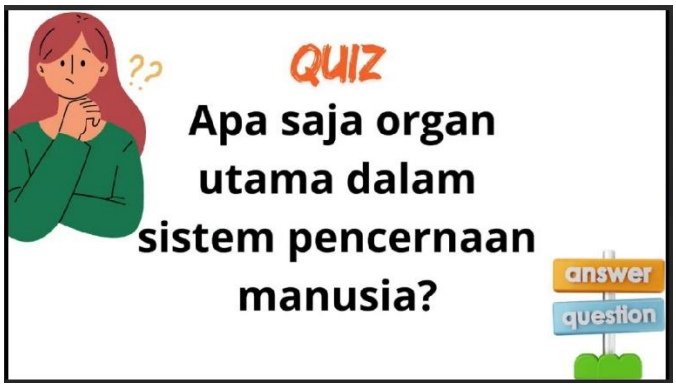

Figure 3: Quiz section view

3.2 Results

The results of learning taken from the pre-test and post-test scores given, as seen in Figure 4.

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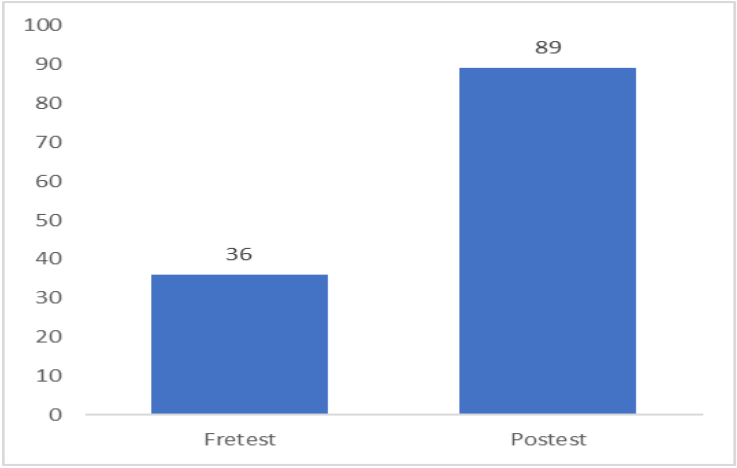

Figure 4: Result of pretest and post-test data

From Table 4 above, the increase in cognitive learning outcomes from the pre-test results was 36, after learning with interactive media and a project-based approach, an increase of 89 was obtained.

Frequency of Data

The data obtained was also subjected to a frequency test which can be seen in Table 1.

Table 1: *Statistics results of frequency data*

		Posttest	Pretest
N	Valid	34	34
	Missing	0	0
Mean		88.53	36.18
Median		90.00	30.00
Mode		90	30
Std. Deviation		10.483	13.929
Minimum		60	10
Maximum		100	60

N-Gain Test

Once it is known that there is an increase in learning outcomes, it is necessary to calculate the N-Gain score to measure the improvement criteria, which can be seen in Table 2.

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Table 2: *Descriptive statistics results of N-Gain test*

	N	Minimum	Maximum	Mean	Std. Deviation
NGain	34	.40	1.00	.8090	.16654
Valid N (listwise)	34				

Based on the table, the N-Gain score of learning outcomes obtained a score of 0.8090, meaning that the interactive learning videos developed and used can improve the learning outcomes of students who are included in the high effectiveness category.

3.2 Discussion

As a learning medium, teachers use video media that has been designed as well as possible based on the material and learning objectives, so teachers choose and develop video media that are truly relevant and support the achievement of expected competencies. After doing this, the teacher shows the video that has been made that is related to the material. The results obtained by teachers in using video media increase understanding of the material presented.

Because understanding is a basic ability for students, every student must have the ability to understand. This is a foundation for students to develop themselves so that they can apply, analyze, evaluate and ultimately the ability to create. One study based on this problem has successfully shown that videos can improve student learning outcomes. Based on the results of this study which applies interactive video media of the digestive system with a project-based learning approach, the use of this interactive video media obtained high effectiveness results in terms of cognitive learning outcomes, this is in line with the results of research by Pasaribu et al. (2025), that students gain a good understanding of biology material through the application of digital learning media with project-based learning. The results of research by Mukra et al. (2024), explain that learning with animation based on project-based learning can foster concentration so that it can improve student learning outcomes.

Likewise with Matondang et al. (2024), that with project-based learning students can collaborate and are able to access various information, and can evaluate the results of the project so that the role of the teacher as a facilitator to ensure that teaching and learning activities run according to learning objectives.

Learning outcomes are a measure of the effectiveness of the learning process. Three general perspectives are used to assess learning outcomes such as cognitive. Students who

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show changes are considered to have succeeded in achieving learning objectives better than before. As in previous studies, the findings of the study indicate that the use of learning media has high effectiveness on student learning progress, including increasing learning outcomes from an average pre-test result of 36 to 89 on the pots-test results. Therefore, it is important to continue to encourage the implementation of more efficient learning media to teachers in implementing it. Thus, it is hoped that there will be a significant increase in the quality of learning and student achievement in the future (Wardani, Kusumaningsih & Kusniati, 2024).

4.0 CONCLUSION

The implementation of project-based digestive system learning video media has proven effective in improving student learning outcomes. This is shown by the achievement of an effectiveness score of 0.8090 which is included in the high category. This means that in one learning activity using this media, student learning outcomes can be improved by 80.9%. The Merdeka Curriculum carries the concept of rich intracurricular learning, where content diversity is the focus. This aims to ensure that students have enough time to understand and explore concepts.

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