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(RESEARCH ARTICLE)

Innovation of Interactive Learning Media Integrated with Factual Videos Supported by a Website on the Topic of Classification of Living Organisms

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Abstract

Education is essential for producing high-quality, adaptive individuals in the digital 21st century. Traditional instruction often results in abstract presentation of scientific concepts, such as the classification of living organisms, which are difficult for students to grasp. This study aims to develop, evaluate feasibility, gauge teacher and student responses, and assess the effectiveness of an interactive, website-based learning media integrated with factual videos for the classification of living organisms in junior high school. Using a Research and Development (R&D) design based on the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), data were collected from material and media experts' validation, teacher evaluations, small- and large-group student trials, and pretest–posttest measures. Qualitative and quantitative analyses were conducted using SPSS 26. Results show that the developed media are highly feasible: expert validation scores were 94.04% for material and 96.42% for media. Teacher evaluation scored 95.82% (very good category). Student feedback was also very positive: 88.75% in small-group trials and 91.29% in large-group trials. The paired-sample t-test revealed a significant improvement ($p < 0.001$), and the normalized gain (N-gain) was 0.63, indicating a moderate level of effectiveness. In conclusion, the interactive, website-based media integrated with factual videos is valid, engaging, and effective in increasing student learning outcomes on living organism classification, while also addressing low motivation and attention in science learning.

Keywords: Interactive Learning Media; Factual Video; Learning Website; Classification of Living Organisms; Learning Outcomes; ADDIE Model

1. Introduction

Education plays a vital role in shaping high-quality and adaptive human resources capable of meeting the challenges of the 21st century. Learning in the digital era requires not only teacher-centered instruction but also active student engagement through contextual and interactive media. The integration of technology into the learning process has become essential, particularly for explaining abstract concepts such as the classification of living organisms [1,2]. Teachers are expected not only to master the subject matter but also to develop learning media that align with technological advancements to provide meaningful learning experiences for students [3,4].

A preliminary study conducted at junior high school 11 Jambi city revealed that science learning remains conventional, relying mainly on printed textbooks and black-and-white worksheets. Both teachers and students reported difficulties in understanding the topic of living organism classification due to the presence of numerous scientific terms that cannot be directly observed, leading students to memorize rather than comprehend the concepts. Based on questionnaire results, 79.4% of students stated that technology-based media combining text, images, audio, and video would facilitate better understanding. The school also provides adequate facilities such as computer laboratories, projectors, and Wi-Fi access, and allows students to use smartphones for academic purposes. These conditions present an opportunity to

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develop a web-based learning medium integrated with factual videos to bridge the gap between abstract concepts and real-world phenomena in science learning.

Factual videos offer an effective alternative for presenting authentic, real-life events that can enhance students' visual and contextual understanding of the material [5]. However, videos alone are insufficient to promote active learning interactions. Therefore, an interactive web-assisted learning medium is needed to enable flexible, self-directed, and evaluative learning. Google Sites serves as a relevant platform due to its accessibility and ability to integrate diverse multimedia content such as text, images, videos, and slides [6,7]. Interviews with science teachers indicated that such

media had never been developed before, and 73.5% of students expressed support for the creation of a website-based learning medium incorporating real factual videos. Previous research [5] focused mainly on offline e-modules in comic format, leaving a research gap in developing interactive, website-based media integrated with factual videos. Thus, this study aims to develop, validate, and evaluate the effectiveness of an interactive website-assisted learning medium integrated with factual videos for teaching the classification of living organisms at the junior high school level.

2. Materials and Methods

This research employed a Research and Development design aimed at producing an innovative learning product in the form of interactive media integrated with factual videos and supported by a website, focusing on the topic of the classification of living organisms for junior high school students. The development process followed the ADDIE model, which consists of five systematic stages: Analysis, Design, Development, Implementation, and Evaluation [8]. This model provided a structured framework to guide the design, creation, and assessment of the media's instructional effectiveness. The study participants were seventh-grade students at junior high school 11 Kota Jambi who had previously studied the topic. The research was conducted in two stages—small-group and large-group trials—based on [9] guidelines, involving 5–8 and 15–30 students, respectively. A purposive sampling technique was applied to select participants according to specific criteria aligned with the research objectives, with assistance from the science teacher to ensure representativeness based on students' academic abilities and characteristics.

The Analysis phase identified classroom learning problems and student needs by validating learning gaps, defining instructional goals, analyzing learner characteristics, evaluating available resources, and selecting suitable delivery systems. The Design phase focused on preparing blueprints, developing content structures, creating flowcharts, setting learning objectives, and determining assessment strategies. During the Development phase, the actual product was created based on the design plan, including multimedia production, preparation of user manuals for teachers and students, and expert validation for both content and media [10]. Formative revisions were conducted according to expert feedback to ensure content accuracy and usability.

The Implementation phase involved testing the developed media in a real classroom setting [11] to determine its effect on students' cognitive learning outcomes. This stage included teacher and student preparation, product trials, and feedback collection. The final Evaluation phase aimed to assess the product's quality and effectiveness before and after implementation by applying defined evaluation criteria, appropriate instruments, and analytical methods. The study used both qualitative and quantitative data. Qualitative data were derived from expert validations and responses from teachers and students through Likert-scale questionnaires, while quantitative data came from pretest–posttest results and validation scores. Media validity was calculated using the formula:

$$\text{Validity (\%)} = (\text{Obtained Score} / \text{Maximum Score}) \times 100$$

Meanwhile, the effectiveness of the developed media was measured using [12] normalized N-gain formula:

$$\text{N-gain (g)} = (\text{Posttest Score} - \text{Pretest Score}) / (\text{Maximum Score} - \text{Pretest Score})$$

The N-gain classification was categorized as follows:

- $g > 0.7$: High
- $0.30 \leq g \leq 0.70$: Moderate
- $g < 0.30$: Low

These analyses were applied to determine whether the developed interactive, website-based media integrated with factual videos effectively improved students' understanding of living organism classification.

3. Results

Based on the initial analysis, several key problems were identified in the science learning process at junior high school 11 Jambi city. Students demonstrated low interest and engagement in science learning, which negatively affected participation and achievement. Sixteen students struggled to understand the topic of the classification of living organisms, as their learning outcomes did not meet the established minimum mastery criteria. The difficulties were primarily caused by a lack of motivation, limited review of learning materials, the use of complex scientific terminology, and the absence of real-life contextualization. The conventional learning media previously used made students passive and unfocused. Therefore, an innovative, interactive, and technology-based learning medium was needed to promote student engagement and independent learning.

The developed product was an interactive web-based learning media integrated with factual videos. The design process utilized Canva to create visual layouts in JPG format, which were then uploaded and developed using Google Sites. The media included various features such as instructional videos, interactive quizzes, discussion forums, hyperlinks, and other engaging elements. The development stages involved designing flowcharts and storyboards, defining learning objectives, collecting relevant references, and formulating testing strategies. After the media was completed, it was validated by material and media experts, followed by trials involving teachers and students to assess the media's feasibility and effectiveness.

The validation results showed significant improvements in all aspects after revisions were made based on expert feedback. The material expert validation confirmed that all aspects were feasible after refinement, while the media expert validation showed improvements in operational, presentation, and technical design aspects. Assessment by science teachers also indicated highly positive results, with an overall product quality score of 95.82%, classified as "excellent," meaning the media was considered suitable for classroom use without further revision.

The small-group trial involving 8 students resulted in a product quality percentage of 88.75%, while the large-group trial involving 30 students showed 91.29%, both categorized as "excellent." These results indicate that the developed learning media was engaging, easy to use, and effective in helping students understand the concept of classifying living organisms (Figure 1).

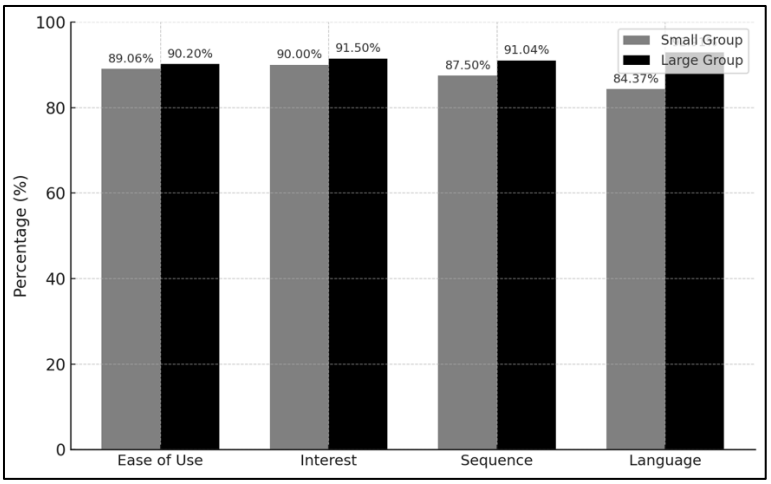

Figure 1 Small and Large Group Response Results on the Interactive Learning Media

The implementation stage was conducted with 30 students over three sessions. The pretest and posttest results demonstrated a significant improvement in students' learning outcomes, with average scores increasing from 46.00 to 79.00. The paired sample t-test showed a significance value of $p < 0.001$ ($p < 0.05$), indicating a statistically significant difference before and after using the media. The normalized N-gain score reached an average of 0.63, classified as *moderate*, demonstrating that the media was effective in enhancing students' cognitive achievement. Eleven students achieved a high N-gain score, while nineteen were in the moderate category, with none in the low category. Overall, these findings confirm that the interactive learning media integrated with factual videos and supported by a website effectively improved students' understanding and learning outcomes in the topic of the classification of living organisms.

4. Discussion

Based on the N-Gain score calculation, which falls within the medium category, it can be concluded that the interactive learning media integrated with factual videos and supported by a website is effective for use in the learning process. This finding is supported by the results of a previous study [13], which stated that the improvement of students' cognitive abilities occurs due to meaningful learning experiences. Such experiences are gained through the use of interactive learning media integrated with factual videos supported by a website. This media not only presents learning materials but also includes various supporting features such as factual videos, Wordwall e-quizzes, discussion forums, and student activities in the form of electronic worksheets. The presence of these features provides students with new and meaningful knowledge and learning experiences, ultimately having a positive impact on improving learning outcomes [5,7].

5. Conclusion

The developed interactive learning media, integrated with factual videos and supported by a web-based platform, demonstrated strong validity and pedagogical relevance for teaching the topic of *Classification of Living Things* at the junior high school level. Expert validation yielded excellent feasibility scores—94.04% from material experts and 96.42% from media experts—while teacher evaluation reached 95.82%, confirming its suitability for classroom use. Student responses were highly positive in both small- (88.75%) and large-group (91.29%) trials, indicating high levels of engagement and usability. Furthermore, the N-gain value of 0.63 reflected a moderate yet meaningful improvement in students' cognitive achievement. Overall, the integration of factual video content and interactive web-based elements effectively enhanced conceptual understanding, learner motivation, and the application of digital pedagogy in science education.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest exists among the Authors.

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