Development of Interactive Multimedia Using Word Wall Through Problem-Based Learning (PBL) Model in Science and Social Subjects

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ABSTRACT

This research is motivated by the suboptimal use of available IT resources in schools by teachers. There is a lack of development of innovative, interactive, and engaging media for students, as well as the absence of technology-based learning media. Therefore, teachers need to improve their ability to create technology-based instructional media to prevent student boredom. The Problem-Based Learning (PBL) model has also not been previously applied in the use of instructional media, especially those based on technology. Based on these issues, this study aims to develop an interactive multimedia learning media using Word Wall and the Problem-Based Learning (PBL) model for Science and Social Subjects (IPAS) learning in grade IV of elementary school that is valid, practical, and effective. This research is a type of Research and Development (R&D) using the ADDIE model. The ADDIE model consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. The designed media was validated by experts using validation sheets in the form of questionnaires. Product validation was carried out by content experts, media experts, and language experts. Practicality was assessed through teacher and student response questionnaires. Finally, effectiveness was measured by giving evaluation tests to students.

Keywords: *interactive multimedia, Wordwall, ADDIE model, independent curriculum, science*

1. INTRODUCTION

The background of this research lies in the fact that the use of available IT in schools has not been maximized by teachers. There is a lack of development of innovative, interactive, and enjoyable media for students, as well as a lack of technology-based learning media (Ariani & Batubara, 2021) . Therefore, teachers need to enhance their ability to create technology-based learning media so that students do not become bored. The Problem-Based Learning (PBL) model has also not yet been applied in the use of instructional media, particularly those that are technology-based (Darmadi, 2017) .

According to Centauri (2019), mastering and being knowledgeable in technology is a competence that educators must possess to support the enhancement of the learning process. For students, technological proficiency can support critical thinking and mastery of science and technology. In today's era, technology is essential for teachers, who are at the forefront of the learning process, in order to adapt to rapid and sophisticated technological developments aimed at facilitating the implementation of learning processes. The success of student learning is highly dependent on teachers who create meaningful learning environments using all available resources and effective teaching methods (Afiani & Faradita, 2021; Ahmat, 2025).

Thus, one of the supporting elements for effective learning content creation is the use of instructional media to provide teaching materials. Nowadays, teachers are required to deliver lessons through the use of ICT, such as e-learning, which can increase student interest in learning independently rather than relying solely on the teacher (Firdausy et al., 2019).

The use of media is one of the key components in achieving learning objectives. The development of media in the learning process cannot be separated from technological advancements (Hilal & Auliya, 2021). Various types of media can now be developed using available technologies to ensure that learning processes continue to meet the needs of students. The importance of learning media lies in its ability to facilitate both teachers and students in conducting a conducive learning process and in providing meaningful learning

experiences. In using media, teachers are expected to bring students into real-life situations so that learning becomes more meaningful through the integration of technology (Khairudin & Hamimah, 2021).

Instructional media helps students to more easily engage with the learning process. Its use can significantly influence the effectiveness of learning (Azrianti & Sukma, 2020). However, the media alone is not enough. An appropriate learning model is needed. A suitable model enhances the instructional media, delivering more meaningful learning experiences to students (Istiqlal, 2018). Students who enjoy learning with the media tend to be more enthusiastic. Media use should also be accompanied by the teacher's efforts in class to understand students' characteristics—particularly their curiosity, high motivation, and desire to explore their surroundings. Given the heterogeneity among students, teachers must strive to balance this with appropriate instructional media (Handayani & Muhammadi, 2020). However, some students still struggle to understand instructions given by teachers. Therefore, an appropriate model is needed to help students make sense of the learning process—namely, a problem-oriented model. One such model is Problem-Based Learning (PBL).

Problem-Based Learning (PBL) is a learning model that presents real-world problems during instruction to enhance students' critical thinking skills. In PBL, students are presented with real-life issues and are required to seek out information from various learning resources, engaging their thinking skills and other abilities either individually or collaboratively. This ensures that all students are actively involved in the process of finding and processing information (Nadia et al., 2022).

Wordwall is an online software platform used as a game-based learning medium for activities such as quizzes and interactive exercises. It offers various templates including image guessing, multiple-choice quizzes, puzzles, and more (Meitriani, et al., 2021). Wordwall is an interactive learning tool in the form of educational games that are easily accessible online via wordwall.net, featuring engaging and diverse designs that can be answered directly by students.

Given the issues mentioned above, there is a need for a learning medium that ensures lessons remain effective—both in online and offline learning contexts. Student engagement in the classroom must be maintained, and the use of instructional media plays a significant role in this. Media can increase enthusiasm, interest, motivation, and provide stimuli for learning activities (Mujahidin et al., 2021), even producing psychological changes in students. It has been proven that the development of interactive media using Word Wall is practical, valid, and effective for classroom instruction. Wordwall is a suitable online learning tool when combined with the Problem-Based Learning (PBL) model, offering more meaningful learning experiences through a variety of instructional processes and templates that make learning more enjoyable.

Based on the problems identified, the researchers were interested in conducting a study on the development of interactive multimedia using Word Wall through the Problem-Based Learning (PBL) model in Science and Social Subjects (IPAS) learning for fourth grade students of elementary school.

2. METHODS

Research and development methods are a research method used to produce a particular product and determine the effectiveness of that product (Saputro, 2017). Development research is a process used to develop and validate educational products. Development research follows a sequence of steps in a specific cycle. The first step is a review of research findings that are developed; based on those findings, a product is developed. After that, field trials are conducted according to the setting where the product will be used, followed by revisions based on the results of the field trials. The development model used in this writing is the ADDIE model.

"The ADDIE model has five stages in its development, namely: first, the Analysis stage; second, the Design stage; third, the Development stage; fourth, the Implementation stage; and fifth, the Evaluation stage" (Branch in Batubara, 2021, p. 44). This model is used because it fits the development writing and the ADDIE model stages are sequential according to the type of development writing to be carried out.

In carrying out research and development, the researcher used two types of data collected, namely: a) Quantitative data, which is data processed in numerical form. Quantitative data can be analyzed using

mathematical calculations. Quantitative data was obtained from questionnaire scores given to students, teachers, and validators. b) Qualitative data, which is descriptive data in the form of sentences. Qualitative research data can be obtained through several methods such as interviews, document analysis, focus group discussions, or observation. This qualitative data was obtained from interviews between the researchers and classroom teachers, questionnaire responses from the principal at the research site, and also feedback and suggestions from validators regarding the developed product and descriptions of the product trial implementation. Data collection instruments are needed in writing to obtain data, and the data obtained serves to answer the research formulation or questions (Lestari and Yudhanegara, 2017). The results of the research data heavily depend on the instrument used; valid data must have a level of reliability and validity.

The method used in this research is the Systematic Literature Review (SLR) method. The SLR method is a method used to collect, examine, evaluate, and analyze relevant research systematically through relevant research questions (Triandini et al., 2019). The stages in this method include planning, implementation, and reporting (Rusydan & Sujatmiko, 2021). These three stages are adjusted to the topic of the literature review so that the stages in sequence include formulating research questions related to interactive multimedia Word Wall to improve critical thinking skills, identifying relevant literature through searching the Google Scholar and Semantic Scholar databases with the help of the Publish or Perish (PoP) software in the range of years 2019 to 2024, selecting primary studies, extracting data, assessing study quality, synthesizing data, and drawing conclusions from the review analysis so that a systematic and structured analysis is obtained in conducting the literature review as a reporting stage.

3.   RESULTS & DISCUSSION

Based on the explanation above regarding the research results obtained, it can be concluded that the development of learning media using Word Wall aligns with the ADDIE development model applied in this study. According to Branch (in Batubara, 2021), the ADDIE model consists of five stages in its development: the first is the analysis stage, the second is the design stage, the third is the development stage, the fourth is the implementation stage, and the fifth is the evaluation stage. In the analysis stage, data was collected through observation and interviews. In the design stage, the researchers formulated plans based on the initial data from the analysis stage, followed by the design of learning media, including the preparation and creation of media using Word Wall. In the development stage, the media underwent a validation test by expert validators and was revised until it was deemed suitable for use in the learning process. In the evaluation stage, the results were reviewed both qualitatively and quantitatively.

The evaluation results of the learning media using Word Wall for the Science subject in Grade IV of elementary school showed excellent quality and were deemed feasible for use. This was evidenced by the validation results from the material, media, and language experts. The validity test for the material aspect received a score of 90%, categorized as very valid. The validity test for the media aspect scored 88.75%, also in the very valid category. Meanwhile, the language aspect received 82.5%, categorized as valid. The use of this learning media in the trial school received highly positive assessments, as shown from the response questionnaires filled out by teachers and 98 students. The practicality test by teachers yielded a result of 95%, categorized as very practical, and the average score from 12 students was also 95%, in the very practical category. Therefore, it can be concluded that the practicality of this learning media falls into the very practical category for classroom use.

4.   CONCLUSION

The results of the validity test indicate that the product was valid and feasible for field use. The validation results from the subject matter expert yielded a score of 90%, categorized as very valid. Media validation score of 88.75% as well as language validation score of 82.5% were categorized as valid. The product was trialed with students at SDN 52 Banda Aceh. Based on the final results of the validity tests, the Word Wall-based learning media was considered valid and feasible for implementation in the field.

The practicality test results of the Word Wall learning media developed in this study were rated as practical by both teachers and Grade IV students and at both the trial and research schools. The practicality level at the trial school reached 95% for teacher responses and 95% for student responses. At the school, the practicality levels were 97.5% for teacher responses and 96% for student responses. Thus, it can be concluded that the Word Wall-based learning media is practical and suitable for classroom use.

The effectiveness test results of the Word Wall-based learning media in Science instruction at elementary school level show that the media is effective in supporting classroom learning. This is evidenced by the increase in student evaluation scores after using the media. At the trial school, the first evaluation showed 77.92%, which increased to 90.42% in the second evaluation. At the research school, the first evaluation score was 83.8%, increasing to 96% in the second evaluation. Therefore, it can be concluded that the Word Wall-based learning media is effective and appropriate for use in the classroom.

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