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Development Of Interactive Multimedia Learning Media Using Wordwall On Mathematics Material Of Multiplication For Students Of Grade III SDN Kaligentong

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Abstract— This research is motivated by the lack of use of learning media in teaching and learning activities. This study aims to describe the process, validity, and practicality in the development of interactive multimedia learning media assisted by Wordwall. This study uses the Research and Development (R&D) method, with the ADDIE development model. The media produced is interactive multimedia learning media assisted by Wordwall. This research was conducted at SDN Kaligentong with 13 students as research subjects in grade III. The procedures used are 5 stages, namely analysis, design, development, implementation, and evaluation. Before being tested, validation must be carried out first with media experts and material experts. The results of the validation of media experts I obtained a value with a percentage of 92.5% which is included in the "very valid" criteria, the validation of media experts II obtained a value with a percentage of 77.5% which is included in the "very valid" criteria. The validation of material experts I obtained a value with a percentage of 97.5%, which is included in the "very valid" criteria, the validation of material experts II obtained a value with a percentage of 75%, which is included in the "valid" criteria. Meanwhile, the results of practicality are assessed from the results of the teacher response questionnaire and student response questionnaire. The results of the teacher response questionnaire obtained a score with a percentage of 92.5%, which is included in the "very practical" criteria, the results of the student response questionnaire obtained a score with a percentage of 89%, which is included in the "very practical" criteria. Based on the results of the study, it shows that interactive multimedia learning media assisted by Wordwall has a positive impact on the learning process in the classroom. The use of Wordwall makes students more enthusiastic and excited, and is able to increase interest in learning. Because Wordwall presents learning materials in an interesting and interactive form, so that students feel like they are playing while learning.

Keywords— Learning Media, Mathematics, Interactive Multiplication Multimedia, Wordwall

I. INTRODUCTION

A. Background

Education at the elementary school level plays a crucial role as the first form of formal education. Elementary education serves as the foundation for success in pursuing higher levels of education [1]. A strong understanding of mathematics will support students' academic success across various fields. Mathematics is one of the most important subjects for students, and there are many reasons why mastering its basic concepts is essential [2]. Mathematics is one of the compulsory subjects taught at all levels of education. Among the various topics covered in mathematics, multiplication is one of the most important. Many elementary school students do not enjoy learning mathematics because they consider it difficult and boring. They often struggle when working on math problems, especially those related to multiplication.

The use of teaching aids or concrete objects that students can manipulate during the learning process can help facilitate a better understanding of the concepts being taught [3]. Currently, mathematics must continue to adapt to ongoing technological advancements [4]. All parties involved in the field of education, including teachers, must be able to utilize technological progress as a means to improve the quality of education [5].

As time progresses and technology continues to develop, learning media have become increasingly diverse. The success of mathematics learning is greatly influenced by all components that support the classroom learning process, namely students, teachers, and instructional media [4]. In the world of education, especially at the elementary school level, teachers face various challenges. One common issue is the boredom experienced by students during the learning process. This is often caused by monotonous learning activities that fail to capture students' attention toward the subject matter. One approach that can be implemented to enhance the effectiveness and efficiency of the learning process is the use of interactive multimedia.

Based on the results of an interview with the third-grade teacher at SDN Kaligentong, it was found that the teaching and learning process in the classroom still relies on

traditional methods with limited teaching aids. Interactive media have not been optimally utilized in the learning process. The teacher has not fully incorporated technology such as educational videos, learning applications, or multimedia presentations that could enhance student engagement and understanding. The learning process still heavily depends on lecture methods and the use of textbooks as the primary source of learning.

Interactive multimedia is a combination of various elements such as text, graphics, video, animation, and sound integrated into software to allow users to interact directly with the content. The use of instructional media, especially by leveraging current technological advancements, makes interactive multimedia play a crucial role in improving the quality of education, including in the field of mathematics [6]. One interesting form of interactive media is the Wordwall application.

B. *Problem Statement*

Based on the background described above, the research problem statements are as follows:

1. How is the process of developing interactive multimedia learning media assisted by Wordwall for multiplication material in the third grade of SDN Kaligentong?
2. How valid is the interactive multimedia learning media assisted by Wordwall in supporting the teaching and learning process of mathematics based on expert evaluations?
3. How practical is the developed interactive multimedia learning media assisted by Wordwall for teaching multiplication in the third grade of SDN Kaligentong?

C. *Research Objectives*

Based on the problem statements above, the objectives of this research are:

1. To describe the development process of interactive multimedia learning media assisted by Wordwall for multiplication material in the third grade of SDN Kaligentong.
2. To describe the validity of the interactive multimedia learning media assisted by Wordwall in supporting the mathematics teaching and learning process based on expert evaluations.
3. To describe the practicality of the developed interactive multimedia learning media assisted by Wordwall for multiplication material in the third grade of SDN Kaligentong.

D. *Expected Product Specifications*

1. Wordwall-assisted learning media is used as a mathematics learning tool for multiplication material for 3rd-grade elementary school students and supports learning activities in accordance with the Learning Objectives (CP).
2. The Wordwall-assisted learning media developed contains content, games, and discussions related to multiplication material.
3. The learning material in the media is designed in the form of information presented with attractive images and animations.
4. The media was developed using the Wordwall platform, with two main features implemented: *Open the Box* and *Find the Match*.

E. *Research Benefits*

The results of this research are expected to provide both theoretical and practical benefits. The benefits of the research can be outlined as follows:

1. Theoretical Benefits
   This research, from a theoretical perspective, can facilitate the teaching and learning process, increase student interest, and provide a more comprehensive learning experience to better understand the material.
2. Practical Benefits
   a. For the Research
      To enhance skills in designing interactive learning media and optimizing the features of Wordwall.
   b. For Students
      To increase motivation, learning interest, and visual thinking skills through enjoyable and interactive media.
   c. For Teacher
      To assist in delivering multiplication material in an engaging way and to encourage innovation in teaching.
   d. For Schools
      To provide relevant and effective learning media that supports the improvement of educational quality.

F. *Assumptions and Limitations*

The Wordwall-assisted learning media is developed based on the assumption that its use can enhance student engagement and understanding of the material, supported by schools that are open to adopting technology. However, this development has certain limitations, such as varying student abilities in adapting to technology and the need for digital devices as well as a stable internet connection.

II. RESEARCH METHODS

A. *Research Model*

The method used in this research is the Research and Development (R&D) method. Research and Development (R&D) is a series of systematic activities aimed at creating innovative new products or improving existing ones. The development model used in this study is the ADDIE model, which stands for Analysis, Design, Development, Implementation, and Evaluation. The ADDIE model is widely applied in the development of specific products in the field of education. [7].

B. *Research Procedure*

The research procedure in this study follows the ADDIE development model. The ADDIE model is recognized as

one of the most popular approaches in the field of instructional design for producing effective designs or products. The following is the diagram of the model used in the ADDIE framework:

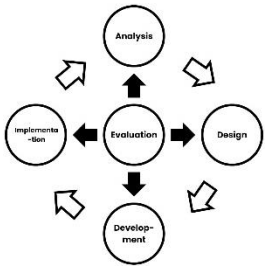


Fig. 1. ADDIE Model

The procedures carried out at each stage of the ADDIE development model are as follows:

1. Analysis
   The researcher conducted a needs analysis through interviews with 3rd grade teachers and curriculum analysis. It was found that the learning process was still conventional, students had difficulty understanding multiplication concepts, and preferred enjoyable learning methods aligned with their concrete operational development stage.
2. Design
   The researcher designed instructional media using Wordwall by creating a flowchart, storyboard, user interface display, and interactive content such as quizzes and games for multiplication material.
3. Development
   The media was developed according to the design, including text, images, animations, and audio to support understanding. Then, validation was conducted by media and content experts to assess the feasibility of the media.
4. Implementation
   The validated media was implemented in 3rd grade mathematics learning, accompanied by guidelines for teachers and students to support their understanding of multiplication concepts.
5. Evaluation
   Evaluation was carried out at each stage of development and after implementation through teacher and student response questionnaires to assess the practicality and effectiveness of the media.

C. Product Trial

1. Product Trial Design
   The purpose of the product trial is to evaluate the feasibility of the developed instructional media based on three main aspects: content, media, and user response. The trial is conducted in two stages: expert validation and user testing.
   a. Expert Validation
      Validation is carried out by subject matter experts and media experts to assess the feasibility of the Wordwall-assisted instructional media. The assessment is conducted using a questionnaire and is accompanied by suggestions or feedback for media improvement.
   b. User Testing
      Uji coba dilakukan dengan mengimplementasikan User testing is conducted by implementing the media in a 3rd grade mathematics class. After its use, teachers and students provide evaluations through questionnaires to measure the practicality and benefits of the media in the learning process.
2. Trial Subjects
   The subjects in this study were 3rd grade students at SDN Kaligentong, totaling 13 students.
3. Types of Data
   This study used two types of data: quantitative data and qualitative data.
4. Data Collection Techniques
   Three data collection techniques were used in this study: expert validation, questionnaires, and documentation.
5. Data Colletion Instruments
   Three types of instruments were used to collect data: validation sheets, student response questionnaires, and teacher response questionnaires.
6. Data Analysis Techniques
   This study employed descriptive analysis techniques to evaluate the validity of the instructional media. The analysis was conducted after data were collected from media experts, content experts, students, and teachers.
   a. Validity
      The level of validity is determined based on assessments from two media expert validators and two content expert validators. The assessments are analyzed using a Likert Scale to determine the extent to which the developed product meets the validity criteria.

Table 1. Likert Scale

Category	Score
Very Good	4
Good	3
Fair	2
Poor	1

The measurement of product validity level is conducted by calculating the percentage using the following formula:

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

Explanation:
P : Validity score percentage
$\sum x$: Total score from respondents' answers
$\sum xi$: Total ideal/maximum score

The resulting percentage of the validity score can then be analyzed using specific criteria.

Table 2. Validity Level

Percentage	Interpretation Criteria

76% - 100%	Very Valid
51% - 75%	Valid
26% - 50%	Less Valid
0% - 25%	Not Valid

b. Practicality
The practicality level of the instructional media is measured based on teacher and student responses through questionnaires. In analyzing the data, a Likert scale is used to measure the level of practicality of the developed product. The Likert scale used is as shown in the following table:

Table 3. Likert Scale

Category	Score
Very Good	4
Good	3
Fair	2
Poor	1

The measurement of the product's practicality level is conducted by calculating the percentage.

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

Explanation:
P : Practicality score percentage
$\sum x$: Total score from respondents' answers
$\sum xi$: Total ideal/maximum score

The resulting percentage of the practicality score can be analyzed using specific criteria.

Table 4. Practicality Level

Percentage	Interpretation Criteria
76% - 100%	Very Practical
51% - 75%	Practical
26% - 50%	Less Practical
0% - 25%	Not Practical

III. RESEARCH RESULT

This section of the study discusses the process and results of the research and development of mathematics instructional media, focusing on multiplication material for 3rd grade students at SDN Kaligentong. The product developed in this study is an interactive multimedia learning tool assisted by Wordwall. This research and development results section presents data from the analysis of problems and needs, the media or product development process, and the product trial.

A. Problem Analysis

At this stage, the researcher conducted interviews with the 3rd grade teacher at SDN Kaligentong to identify the problems present at the school. The results of the interview indicated that students were still having difficulty understanding the concept of multiplication, and there were limitations in the use of instructional media, particularly in utilizing technology-based media.

B. Design

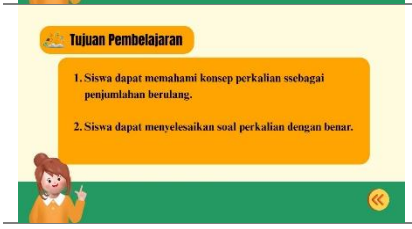
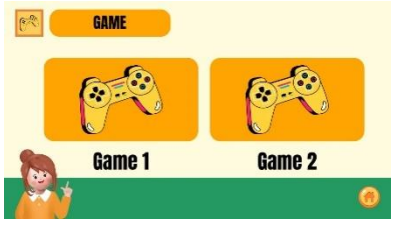
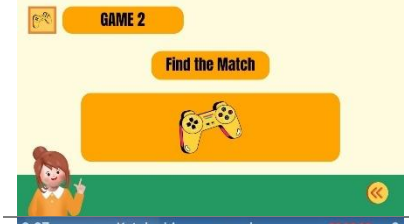
After identifying the problems at the school, multiplication material was selected as the focus of development. This was based on the consideration that the concept of multiplication requires innovation in instructional media to support students' understanding and help overcome the difficulties they experience.

C. Development

The result of the development in this study is an interactive multimedia learning media utilizing the Wordwall platform for the subject of mathematics, specifically multiplication material.

Table 5. Stage of Instructional Media Design Development

Display	Description
	Initial display showing the lesson title, target grade level, school identity, and a start button or start icon to access the learning media.
	Features a main menu display consisting of three options: introduction section, learning material, and educational games.
	When the introduction menu is clicked, three key components appear: media usage instructions, learning outcomes, and

	learning objectives.
	Instructions for use and navigation guide to facilitate ease of operation in using the learning media.
	Instructions for use and navigation guide to facilitate ease of operation in using the learning media
	Learning achievements in 3rd grade mathematics on multiplication material.
	Learning objectives in 3rd grade mathematics on multiplication material.
	Learning material presented in the form of an animated video for 3rd grade mathematics on multiplication
	Game display linked to the Wordwall website, utilizing two features available on Wordwall.
	Game 1 uses the Wordwall feature "*Open the Box*".
	Game display using the Wordwall feature "*Open the Box"*
	Game 2 uses the Wordwall feature "*Find the Match*".
	Game display using the Wordwall feature "*Find the Match*".
	Finished.

D. *Media Validation*

Before the product trial was conducted, a validation process was carried out to ensure that the product was valid and ready for use. This validation process involved two key aspects: validation by media experts and validation by content experts. The individuals responsible for validating the media and content were lecturers from Bhinneka PGRI University. Mr. Nugrananda Jannattaka, M.Pd., served as Media Expert Validator I, and Mr. Aldila Wanda Nugraha, S.Si., M.Pd., served as Media Expert Validator II. For content validation, Ms. Dya Ayu Agustiana, M.Pd., acted as Content Expert Validator I, while Ms. Noraniza Bahrotul Ilmi, M.Mat., was appointed as Content Expert Validator II.

Table 6. Media Validation Results

No.	Validator	Percentage	Criteria
1.	Media Expert I	92,5%	Very Valid
2.	Media Expert II	77,5%	Very Valid
3.	Content Expert I	97,5%	Very Valid
4.	Content Expert II	75%	Valid

E. *Implementation*

The implementation of the trial aimed to measure the level of practicality of the interactive multimedia learning media that utilizes the Wordwall platform. This trial was conducted at SDN Kaligentong, involving 13 third-grade students as research subjects. After the learning media was applied, the students were given the opportunity to interact with educational games and complete the

exercises provided within the linked media. dengan platform *Wordwall* secara bergantian.

Table 7. Implementation Result

No.	Validator	Percentage	Criteria
1.	Students	89%	Very Practical
2.	Teacher	92,5%	Very Practical

F. Evaluation

This stage is used to review and assess all the previous stages, starting from the analysis, design, development, to implementation processes. Product evaluation is carried out to improve any shortcomings in the learning process.

Table 8. Product Evaluation

No.	Validator	Suggestion
1.	Media Expert	Improve the navigation buttons
2.	Content Expert	Align with CP (Learning Objectives), TP, and ATP.

IV. CONCLUSION

The development of interactive multimedia learning media assisted by Wordwall for the 3rd grade mathematics subject on multiplication at SDN Kaligentong used the ADDIE development model, which consists of Analysis, Design, Development, Implementation, and Evaluation stages. This study resulted in the following percentages: Media Expert Validator I achieved 92.5% with a "very valid" criterion; Media Expert Validator II achieved 77.5%, also categorized as "very valid"; Content Expert Validator I achieved 97.5% with a "very valid" criterion; Content Expert Validator II achieved 75% with a "valid" criterion. The student response questionnaire received a score of 89%, categorized as "very practical," and the teacher response questionnaire scored 92.5%, also categorized as "very practical."

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