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Development Of Interactive Learning Media Based On The Google Sites Website Assisted With Wordwall On Logarithm Material

Zahroatul Fitroh[1]*, Zainullah Zuhri[2]
[1,2] Universitas Nahdlatul Ulama Pasuruan
[1]fitrohzahrotul@gmail.com, [2]zuhri@itsnupasuruan.ac.id
*Correspondence

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Abstract

This research aims to develop website-based interactive learning media with the help of a wordwall on logarithm material. The research method uses Research and Development (R&D) with the ADDIE development model with stages of Analysis, Design, Development, Implementation, and Evaluation. The subjects of this research trial involved 40 class X students of Al-Yasini Superior High School, school teachers, and lecturers in the Mathematics Education Study Program Nahdlatul Ulama' University. Data collection techniques in this research are interviews and learning media assessment questionnaires. Next, the data was analyzed using a Likert measurement scale. The research results show that the media: (1) Website-based interactive learning media assisted by wordwall on logarithm material is said to be valid by media experts with a percentage of 92%, and material experts 95%; (2) learning media is said to be practical by small group students with a percentage of 84% and large group students with a percentage of 77%; (3) learning media is said to be effective based on the results of the game scores obtained by large group students with scores that reach the minimum completeness criteria of 75 in mathematics subjects. From these 3 conclusions, it can be said that the media has been assessed with a good predicate and can be used in related material by teachers.

INTRODUCTION

Technology has an important role in human life, especially in the field of education. As science and technology develop, educational technology can help improve the quality of learning to a higher quality. Educational technology is always looking for and making improvements, as well as interesting innovations so that the learning process is more effective and efficient (Somang, 2020).

Technology in Indonesia, which is developing in the education sector, requires students to be able to know, understand, and master complex areas of science, especially in mathematics lessons. (Nurbiantoro, 2016). Mathematics is a science that has a very important role in the ongoing development of technology, one of which is that mathematics plays a role in creating the science of logic, which is the basis for programming, so mathematics needs to be taught at all levels of education, from elementary school to university. (Muyassaroh & Masduki, 2023). However, mathematics

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is one area of science that is still considered difficult by students because it is less interesting and boring (Indofah, Vitriana & Hasanudin, 2023).

Mathematics has one specialization material, namely logarithms, which is taught at the high school (High School) level. This material is still considered difficult for students because students have to master quite a lot of concepts and properties of logarithms, and they have to understand these concepts before they study the next material, namely logarithmic functions (Muliana, 2021). Logarithms are one of the mathematical topics that are considered difficult by students. This is revealed by the large number of students who experience errors in reading questions, lack of understanding of the prerequisite material and the main material being studied, lack of accuracy and mistakes in interpreting or applying formulas, miscalculations, and forgetting. Concept while working on the problem (Hayati, 2018).

In this case, a teacher needs learning media to create a learning atmosphere that is fun, interesting, creative, and innovative. Learning media that is fun, interesting, creative, and innovative is media that can contain audio, video and images or what is usually called Interactive Media. (Marwanti et al., 2022). Interactive media is utilized and used to provide meaningful experiences, increase students' enthusiasm for learning, and make the class atmosphere more cheerful and less monotonous. One of the interactive learning media used in this research is website-based learning media in the form of Google Sites. Google Sites is a reference for learning media from Google which is quite easy and practical to use in preparing learning media (Kusumaningtyas, 2022).

The facilities offered by Google Sites are very diverse and can be collaborated with other websites. So researchers will collaborate with Google Sites with Wordwall as a web provider of educational games. Wordwall has provided various facilities to support learning activities at school, teachers can create learning media such as games on this website. wordwall is an application that contains website-based quizzes that can be accessed via a browser on a cellphone, PC or laptop (Kustandi & Darmawan, 2020).

Based on interviews conducted by researchers with Mrs. Aliyatul Hikma, S.Pd., as a mathematics teacher at Excellent Al - Yasini High School, information was obtained that the conditions at Excellent Al - Yasini High School already support the use of technology-based media. However, in the teaching and learning process, teachers predominantly use printed books, the use of technology-based media in the learning process is still not optimal, and the teaching and learning process is still centered on the teacher, which tends to make students feel bored and fed up. Based on the researcher's experience in carrying out the Introduction to Schooling Field II assignment at Al-Yasini Excellent High School, getting information from students who had difficulty understanding mathematics learning, he revealed that mathematics learning activities were still less interesting and boring, especially in the logarithms material that he had just studied. With the teacher. Students also expressed that this was because teachers had not utilized learning media as a tool to convey learning in class.

In response to this, the researchers tried to develop a website-based interactive learning media with the help of exciting and interesting educational games that contained

logarithmic material. It is also hoped that difficulties in understanding logarithm material can be overcome with this learning media. It is hoped that with this media, in addition to providing an interactive and enjoyable learning experience, students will also understand the material being taught better.

METHOD

This research uses a quantitative approach because it relies on data in the form of numbers that can be processed through statistical techniques. This approach is in line with Arikunto's perspective, which states that quantitative research involves the collection, interpretation, and analysis of numerical data (Shofiatul, 2022). This research is a type of quasi-experimental research using a non-equivalent control group design. The independent variable in this research is the application of the Problem-Based Learning Model assisted by PowerPoint-based interactive learning media. The dependent variable in this research is increasing students' problem-solving abilities and mathematical disposition.

The sampling technique applied in this research is Cluster Random Sampling, namely grouping based on region or location of the population because the research object has a very broad scope (Pulungan, 2018). The classes selected as research samples were class 7A with 25 students as a control class with conventional learning and 7B with 25 students as an experimental class with PBL learning assisted by PowerPoint-based interactive learning media.

The data collection technique used in this research is using pretest and post-test instruments to measure students' mathematical problem-solving abilities as well as questionnaire instruments to measure students' mathematical dispositions. The data analysis used in this research is comparative parametric statistical data analysis because this research aims to compare two groups (Muhid, 2012). The data analysis was carried out using SPSS Statistics 24 for Windows software in the form of a t-test.

The method used by researchers is Research and Development (R&D). R&D methods generally use various development models (Rahmawati, 2021). In this research, researchers developed the ADDIE development model, which stands for Analysis, Design, Development, Implementation, Evaluation (Firdiana, 2020). The description of the ADDIE development model consists of 5 stages, namely as follows.

1. Analysis Stage, the activities carried out at this stage are Analysis of Interactive Learning Media Aspects which includes material analysis, analysis of learning outcomes & learning objectives.
2. Design Stage. The activities carried out at this stage are the preparation of validation questionnaire instrument grids for experts (material experts, media experts) and evaluation questionnaires for students. then design the learning media components, arrange all the components that have been obtained until completion.
3. Development Stage: The activities carried out at this stage are trials which result in an assessment of the final product of the learning media. Before the final results, this media goes through a media assessment and revision stage first based on comments

and suggestions by experts (material experts, media experts), and the results of small-scale student trials.

4. Implementation Stage: The activities carried out in the implementation stage are that the final product will be tested on a large group of 30 students. Students will be given a questionnaire to provide assessments and suggestions for media and playing games on the website.
5. Evaluation Stage: The activity carried out at this stage is an evaluation of the learning media based on the results of student response questionnaires in trials using learning media (Dwiranata, 2019).

Data collection techniques in this research were interviews and validation questionnaires from learning media experts (Kartika, 2014). The interview technique used in this research is unstructured, meaning that the interview does not have special guidelines that are structured systematically. The interview was submitted to the mathematics subject teacher at Al - Yasini Excellent High School. The learning media validation technique uses a structured assessment questionnaire using a Likert scale. The questionnaire has several assessment aspects in it. The learning media assessment validation questionnaire is filled out by experts (media experts, material experts), small groups of students during trials. After the questionnaire assessment stage is carried out, the revision stage continues if there are criticisms and suggestions from experts, then continues with large group trials which are carried out by filling out media assessment validation questionnaires and playing games about logarithms in learning media (Nurfadhillah, 2021).

The data collection instruments used in this research were interview guidelines, validation of material experts and media experts, and assessment of learning media instruments by students. The instrument used is a questionnaire that can be measured using a Likert scale. The Likert scale is a scale used to measure attitudes, perceptions, and opinions of a person or group of people who are asked to complete a questionnaire or questionnaire (Rhomdani, 2017). The use of a questionnaire with a Likert scale as a data collection method was chosen because it is used to measure attitudes and perceptions, ease of data analysis, and flexibility of use.

RESULTS AND DISCUSSION

The results of the development of learning media in the form of a Google Sites website with the help of a wordwall on logarithm material are as follows:

1. Analysis stage, this stage is carried out with the help of subject teachers at Al - Yasini Excellent High School. This stage obtains the results of reference material on logarithms, achievements and learning objectives used by the school. Needs analysis is a systematic process to identify gaps between current conditions and desired conditions. In this context, the analysis is conducted to understand the needs and characteristics of students related to logarithm material, as well as the learning objectives to be achieved (Watkins, 2015).
2. Design Stage, This stage produces the following results:

a. The data collection instrument (learning media assessment validation questionnaire) was then validated by the Mathematics Education Lecturer
b. Components, materials that have been obtained and according to subject teacher references are designed and conceptualized for preparing learning media.
c. Preparation of learning media components that have been obtained to become prototype products that are ready to be assessed by experts and students.

3. Development Stage: This stage is carried out by 3 assessment subjects and receives revisions to the learning media, including the following:
   a. Material experts assess the media using a questionnaire containing 16 statement items with a criteria score of 10. The results obtained for learning media are 95% with the criteria "Very Valid".

Table 1. Total Material Expert Assessments

No.	Aspect	Total Score	Criterion Score	Percentage
1	Material	46	50	92%
2	Language	29	30	97%
3	Exercise	47	50	94%
4	Implementability	30	30	100%
	Total Number	152	160	95%

   b. Media experts assess media using a questionnaire containing 20 statement items with a criteria score of 10. The results obtained for learning media are 92% with the criteria "Very Valid".

Table 2. Total Material Expert Assessments

No.	Aspect	Total Score	Criterion Score	Percentage
1	Usability	47	50	94%
2	Functionality Visual	56	60	93%
3	Communication	81	90	90%
	Total Number	184	200	92%

   c. Small group students assessed the media using a questionnaire containing 16 statement items with a criteria score of 50. The results obtained for learning media were 84% with the criterion "Very Practical".

Table 3. Total Small Group Student Assessments

No.	Aspect	Total Score	Criterion Score	Percentage
1.	Content Rules	127	150	85%
2.	Governance	295	350	84%
3.	Website Media	81	100	81%
4.	Content	167	200	84%
	Total Number	670	800	84%

   d. The next stage is revision according to suggestions and comments by media experts and material experts. When completed, the implementation stage can be continued

4. The implementation stage, stage is carried out by large groups of 30 students. There were 2 assessments analyzed by researchers in the large group of students, including:
   a. Large group students assessed the media using a questionnaire containing 35

statement items with a criteria score of 150. The results obtained for learning media were 77% with the "Practical" criterion.

Table 4. Total Large Group Student Assessments

No.	Aspect	Total Score	Criterion Score	Percentage
1.	Content Rules	567	750	76%
2.	Governance	1265	1650	77%
3.	Website Media	706	900	78%
4.	Presentation of Material	475	600	79%
5.	Exercises	458	600	76%
6.	Games	595	750	79%
	Total Number	4066	5250	77%

b. Large groups of 30 children played 2 types of games in the learning media; all the game scores they got were calculated using the specified formula, and the learning media got a result of 66% with the "Effective" criteria.

Table 5. Total Learning Media Game Scores

No.	Types of Games	Total Score	Criterion Score	Percentage
1.	Determining Logarithmic Results	2040	3000	68%
2.	Matching Properties of Logarithms	1930	3000	64%
	Total	3970	6000	66%

5. The Evaluation Stage is obtained from comments and suggestions on assessments that have been completed by students on a large scale. This evaluation stage is a follow-up to create better media, it can also be used as motivation, as well as an inspiration for creating further website learning media, which can be used as learning media in schools with more diverse material and paying attention to the evaluations that have been obtained.

In the discussion of the final product study, the results of the learning media product, which have gone through the revision stage, will be presented. The Google Site website media assisted by the wordwall game can be used when the internet network is stable; if the internet network is less stable, it will affect the use of the website. Website addresses can be shared via WhatsApp or applications used to send messages, websites can also be opened using laptops, PCs, and cellphones. The following is a study of final stage learning media development products. Learning Media Link: https://sites.google.com/d/1PPjLXvJvJQ-PscdmLWvz6uL-beLyze86/p/13YFSinJngI5huCG4Wj3yQuL9eUDji49_/edit

CONCLUSION

The results of the research show that the website-based interactive learning media assisted by Wordwall on logarithm material is very valid, with a percentage of 95% by material experts, and the criteria are very valid, with a percentage of 92% by media experts. Based on the expert scores, it shows that the learning media is valid. The small group students' assessment received very practical criteria with a percentage of 84%, and

the large group students received practical criteria with a percentage of 77%. Based on the results of the student scores, it shows that the learning media is practical to use. The media obtained effective criteria with a percentage of 66% for the wordwall game scores obtained by students during large group trials. Based on the results of the students' game scores, it shows that the learning media is effective to use. The suggested development research from the results of this study is the development of additional features in interactive learning media that can be personalized, as well as the development of learning media for other mathematics topics.

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