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Development of Interactive Learning Media Assisted by Genially in Learning Mathematics Simple Fraction Material for Grade II Elementary School

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***Abstract*—Mathematics is a subject that is considered monotonous for students. This study aims to develop genially assisted interactive learning media in mathematics subjects of simple fractions for grade II students. The research method used is R&D (Research and Development) with the ADDIE model which consists of five stages, namely Analysis, Design, Development, Implementation, and Evaluation. The subjects of this study were second grade students of SD N II Doroampel, totaling 15 students. The results obtained based on the research are the results of media expert validation I got a percentage of 81% with a very valid category. While the media expert validator II gave a percentage of 97% with a very valid category. The results of material expert validation with validator I got a percentage of 95% with a very valid category and validator II got a percentage of 97% which was included in the very valid category. Based on the teacher response questionnaire, the percentage score is 95% with a very good category, while for the student response questionnaire, the percentage score is 92% with a very good category. It can be concluded that the Interactive Learning Media Assisted by Genially in Learning Mathematics Simple Fraction Material Class II Elementary School is very valid to be applied to grade II students of SD Negeri 2 Doroampel**

Keywords : Genially, Interactive Learning Media, Mathematics

I. INTRODUCTION

Education in its broadest sense can be defined as a life experience. Education includes all knowledge acquired throughout life in various situations that can enhance individual development [1]. Education is one of the main aspects in the development of a country. Education is an effort made by individuals to provide direction and guidance to the younger generation as the nation's successor [2].

Based on the above opinion, it can be concluded that education means the process of educating carried out by teachers to students, where adults try to provide role models, learning, guidance, and improve ethics and morals. In addition, it is also emphasized that teaching does not only come from formal education, but also involves the role of family and society in shaping parenting patterns that can encourage and improve the knowledge and understanding of students [3].

Nowadays, many elementary school children have difficulties and lack of interest in learning in mathematics. Some students have difficulty in understanding math concepts, this can be seen from the number of students who get low scores in assignments and tests. One of the causes of low learning outcomes is the method of learning mathematics in elementary schools which tends to be monotonous, such as the use of lecture methods and assignments, which makes students feel bored and less interested in learning. Teachers need to make various efforts to help students more easily understand the learning material [4].

Mathematics is defined as the science concerned with logic, form, structure, magnitude, and interconnected concepts. Mathematics includes various branches such as arithmetic, algebra, geometry, and analysis. It is concluded that math subjects are given to students starting from pre-school, but this does not affect students' interest in learning, even though some children still think that math is just a scary specter with boring numbers [5].

Based on pre-observation conducted by researchers at SD Negeri 2 Doroampel, during the mathematics learning process the teacher emphasizes students to find out about the material themselves in groups by reading Cerdas Tangkas books with designs that are less attractive to children. This makes it difficult for students to understand the subject matter during the learning process, so it is necessary to have a new interactive learning media for mathematics so that students feel happy and can understand the subject matter easily, one of which is using technology-based learning media.

Along with the development of increasingly sophisticated technology, it is hoped that when learning can take advantage of this, one of which is by developing interactive learning media that is more interesting and interactive. Interactive learning media is a tool or system designed to enhance the learning experience by allowing two way interaction between learners and learning materials. Interactive learning media serves to facilitate a more active and interesting learning process, so as to increase learner involvement in learning [6].

Students need to be stimulated through the use of game-based interactive learning media to stimulate students' interest in learning in the classroom. Genially is one of the online learning platforms that can support teachers in creating

innovative and creative learning materials, such as presentations, games, learning videos, and others. The advantages of genially can be used to create games according to the material you want to teach. Genially application has advantages, among others: (1) providing a variety of templates, animations, and texts that can be easily customized for user needs, (2) allowing practical content processing, (3) buttons that can be customized with spreadsheets both before and after use, (4) unlimited versions and customizations, (5) supporting collaboration between learners and teachers, (6) having a community of content creators who regularly share new content, and (7) automatic saving feature [7].

Interactive learning media supported by Genially demonstrates advantages over printed interactive learning media because (a) it can be accessed free of charge, (b) it is more practical because it does not require printing, (c) it can be accessed via smartphones or laptops, (d) it functions as interactive learning media and instruction during online learning sessions, and (e) it does not require additional storage space. The use of interactive learning media products involves important supporting facilities, such as: (a) at SD Negeri 2 Doroampel, training in computer use is conducted to enhance students' skills in operating computers or laptops, (b) availability of a WiFi network, and (c) the majority of students have personal mobile phones.

Based on this, to increase enthusiasm for learning mathematics, the use of modern and interesting interactive learning media is needed. The reason for taking a case study at SD Negeri 2 Doroampel is because the researcher aims to design the development of interactive learning media by integrating games, exercises, and material containing tips and tricks to provide learning visualization for students. Print-based interactive learning media are less effective in the context of their application in mathematics education. This study is expected to make students more enthusiastic about learning mathematics. Based on the explanation provided, it is hoped that in-depth information can be obtained to conduct the research titled, "Development of Interactive Learning Media Assisted by Genially in Teaching Simple Fractions in Grade II Mathematics at Elementary School."

II. METHODS

The type of research used in this study is Research and Development. Research and Development (R&D) is a series of processes or steps to create new products or improve existing products [8]. The model used in the development of this interactive learning media uses the ADDIE model (analysis, design, development, implementation, evaluation). According to Cheung (2016) as cited in [9] tates that the ADDIE model is a model that is easy to use and can be applied in a curriculum that teaches knowledge, skills, or attitudes. Visually, the ADDIE stages can be seen in Figure 1.

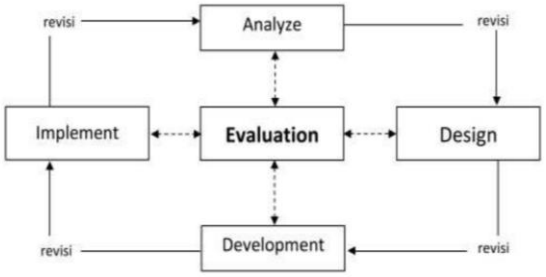

Figure 1 Stages of ADDIE Model (Scheme by Branch, 2009)

Based on the development model used, the ADDIE model was used as a research procedure. The stages of development research include :

1) Analysis

The analysis stage according to Branch (2009) aims to identify potential causes of performance gaps in learning [10]. At this stage, it is used in analyzing and collecting information related to problems in class II at SD Negeri II Doroampel, Sumbergempol, Tulungagung.

2) Design

The design stage according to Branch (2009) explains that at this stage we need to identify the strengths and weaknesses in the existing syllabus [10]. At this stage, the focus is on designing interactive learning media, one of the important studies in this interactive learning media development stage is curriculum review, which includes Cover, Instructions for Use, CP, ATP, TP, Material, Practice Questions, Games and Ice Breaking.

3) Development

The Development stage according to Branch (2009) aims to produce and validate learning resources that have been selected [10]. Research at the development stage is the stage of making genially assisted mathematics learning media. The development stage includes:

a) Setting up a genially website/link

b) Create a genially account to easily access the features on genially

c) Prepare design plans, such as color variations, sizes, fonts etc

d) Designing the parts according to the initial design.

e) Developing genially-assisted interactive learning media design

f) Inserting materials and sample images in the places that have been designed.

g) Displaying genially-assisted interactive learning media that has been designed.

h) Genially assisted learning media is ready and can be implemented in learning.

4) Implementation

The Implementation Stage according to Branch (2009) aims to enable teachers to prepare the learning environment and engage learners effectively in the learning process [10]. After the product has been authorized by several validators, the product will be tested on grade II students at SD Negeri 2 Doroampel, Sumbergempol, Tulungagung. If the product has been declared feasible, then the media can be implemented in the context of the educational process, especially as a learning instrument at the elementary school level.

5) Evaluation

The evaluation stage according to Branch (2009) aims to assess the quality of teaching products and processes, both before and after the stage [10]. General procedures associated with this stage include determining evaluation criteria, selecting appropriate evaluation tools, and conducting the evaluation. The general procedures associated with this stage include determining evaluation criteria, selecting appropriate evaluation tools, and conducting the evaluation.

III. RESULT AND DISCUSSION

Problem and Needs Analysis Results

Findings from the results of problems in the field that current learning activities are only simple such as the blackboard, so that learning activities become monotonous and less fun, teachers implement learning methods such as questions and answers, discussions, and lectures. Although these methods have been implemented quite well, innovation is still needed, especially in the form of supporting learning media, so that the learning process becomes more meaningful for students. Some of the findings of the problem, it can be concluded that the results of the needs analysis using genially assisted interactive learning media are made by including reading material, ice breaking, tips and tricks, and interesting problem exercises using Agile Smart Books with attractive learning media.

Product Development Analysis Results

The results of the analysis of product development of Genially Assisted Interactive Learning Media for Mathematics Subjects Simple Fractions, the description includes :

1) Planning of Genially Assisted Interactive Learning Media :

a. Structure of Genially Assisted Interactive Learning Media

The structure of this interactive learning media includes several main components, namely: (1) cover, (2) instructions for use, CP, ATP, and TP, (3) learning materials, (3) practice questions (4) games (5) learning videos or ice breaking.

b. Theme Selection

Selection of the sea theme so that students can also recognize and be interested in various kinds of marine life.

c. Font selection

Typeface that is clear and easy for students to read, namely Barricieto and Viga measuring 22 - 45 px.

d. Supporting Features of Genially Assisted Interactive Learning Media

The use of appropriate illustrations, lively and colorful moving animations, and learning videos, accommodates the visual learning style of elementary school students.

2) Initial Product Format Development

This stage will describe the initial product development, which is as follows :

Table 1 Initial Design of Genially Assisted Interactive Learning Media

Product Picture	Description
Cover  **Figure 2** Cover Design	The cover design is made in accordance with the title, namely "Simple Fractions". This interactive learning media has the theme of marine life, so it is dominated by dark blue and light blue colors.
Menu  **Figure 3** Menu	Menu display which includes : 1. Ayo Mencermati ! : Petunjuk Penggunaan, CP, ATP, TP 2. Ayo Memahami ! : Materi Pembelajaran 3. Ayo Berlatih ! : Latihan Soal 4. Ayo Bermain! : *Games* 5. Ayo Menyanyi ! : *Ice Breaking*
Instructions for Use, CP, ATP, and TP  **Figure 4** Instructions for Use	A display that contains Instructions for Use, Learning Outcomes. Flow of Learning Objectives, and Phase A Learning Objectives of grade 2 mathematics.

Learning Materials  **Figure 5** Learning Materials	A display containing learning materials and tips and tricks for grade 2 math subjects on simple fractions. The existence of tips and tricks makes it easier for students to distinguish and memorize the difference between the numerator and denominator..
Practice Questions  **Figure 6** Practice Questions	A display containing practice questions related to learning material: 1) If the answer is correct, it will appear on the feedback screen for students. 2) If the answer is wrong, it will appear on the feedback screen for students
Game  **Figure 7** Game	Display that contains a simple game that is interesting for students but still educates so that students can show simple fractions.
Ice Breaking  **Figure 8** Ice Breaking	A display that contains interesting ice breaking so that students can easily memorize material on simple fractions. The existence of ice breaking makes learning more fun and makes it easier for students to distinguish and memorize the difference between numerator denominator.

3) Validation of Genially Assisted Interactive Learning Media

The results of the validation of genially assisted interactive learning media are explained in the following table:

Table 2 Results of Validation of Genially Assisted Interactive Learning Media

Validation Result	Quantitative Data		Quantitative Data
	Score	Category	
Material Expert I	95%	Very Valid	Overview of simple fractions $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ adjusted again.
Material Expert II	97%	Very Valid	This Interactive Learning Media has no revisions and is good because there are animations, fun ice breaking, and tips and tricks.
Media Expert I	81%	Very Valid	Worth using without revision
Media Expert II	97%	Very Valid	Can be used with revision
Students Response Questionnaire	100%	Very Valid	Worth using without revision
Teacher Response Questionnaire	90%	Very Valid	Adjusted again in choosing elements such as images and videos are two different things
Interview Instrument Sheet	96%	Very Valid	The instrument can be used for research. The instrument is very good to use

4) Product Trial Analysis Results

Results of the Students Response Questionnaire on the Field Trial

The number of respondents is all second grade students of SD Negeri 2 Doroampel consisting of 6 female students and 9 male students. The results of the field test of the learner response questionnaire are described in the following table :

Table 3 Field Test Results of Students Response Questionnaire

No	Student Name	Score	Result (%)	Description
1.	BIM	65	87%	Very good
2.	MZ	63	84%	Very good
3.	ANK	70	93%	Very good
4.	FZM	69	92%	Very good
5.	FTB	68	90%	Very good
6.	JDY	62	83%	Very good
7.	MAR	71	94%	Very good
8.	MAZ	69	92%	Very good
9.	NAL	67	89%	Very good
10.	NRA	66	88%	Very good
11.	NRS	68	90%	Very good
12.	RYH	70	93%	Very good
13.	TAA	72	96%	Very good
14.	SPN	60	80%	Good
15.	SCR	63	84%	Very good
	Average	69	92%	Very good

Based on the overall results of the field test, the students' response questionnaire to genially assisted interactive learning media obtained a score of 69 with a percentage of 92% which was included in the very good category used in the learning process.

Results of Teacher Response Questionnaire in Field Test

The results of the field test, the teacher response questionnaire to interactive learning media assisted by Genially obtained a score of 76 out of 80, with a percentage of 95%, which is classified as very good for use in the learning process.

Discussion

1) The Development Process of Genially Assisted Interactive Learning Media

The development process of genially assisted interactive learning media uses the ADDIE development model, which consists of five main stages, namely Analysis, Design, Development, Implementation, and Evaluation. This model was chosen because it is systematic and considered relevant to produce effective and interesting teaching materials, especially for students at the elementary school level. This statement is the same as research conducted by Annisa Khdijah in 2025 entitled "Development of Problem Solving-Based Learning Media Using Genially Application on Grade V Flat Buildings Material" that the ADDIE development model plays a role in improving learning performance in the field of education, especially in designing learning product designs [11]. In the analysis stage, researchers conducted observations in class II SD Negeri 2 Doroampel and found that the learning media used were still less interesting and limited, such as only using a blackboard with monotonous learning resources such as the use of Cerdas Tangkas books. The design stage includes designing the content structure, font selection, supporting features, and size of teaching media. Entering the development stage, the making of genially assisted interactive learning media was carried out according to the design that had been prepared, then validated by two material experts and two media experts. The implementation stage was carried out after the product was declared valid by the experts. The trial was conducted in class II of SD Negeri 2 Doroampel, where students used genially assisted interactive learning media in learning activities. After the implementation, researchers distributed questionnaires to students and class teachers to find out the response and assess the effectiveness of using genially assisted interactive learning media.

The obstacle during implementation at SD Negeri 2 Doroampel is that the design of the interactive learning media that researchers developed does not yet have a "back" button so that when students want to return to the previous page it cannot be done. The absence of this button causes learners to be unable to re- navigate or access previous material while undergoing learning. Overcoming these obstacles, media developers are advised to add navigation buttons to genially allow users to add programmable interactive buttons with the "go to page" action by adding a "Back" button on each slide or page, users can return to the previous page easily and flexibly.

2) Validity of Genially Assisted Interactive Learning Media

This genially assisted interactive learning media also needs to be tested for validity by media experts and material experts who aim to get the results of the feasibility of genially assisted interactive learning media that has been developed. In media expert validation with validator I getting a score of 61 out of 75 with a percentage of 81% and validator II getting a score of 73 out of 75 with a percentage of 97%, so that the media is categorized as very valid (85-100%) and can be used in the learning process.

Material expert validation I scored 71 out of 75 with a percentage of 95% and validator II scored 73 out of 75 with a percentage of 97% which is categorized as very valid. This interactive learning media is categorized as very valid (85-100%) and can be used in the learning process.

In the results of previous research by Anisya Yolanda and Santa in 2023 with the title "Development of Interactive Learning Media Using Genially on the Material of Norms in the Customs of My Region" it is known that printed learning media generally require a lot of time and money, and students' interest in printed media is decreasing, therefore it is necessary to have the presence of learning media that adds to the enthusiasm of students [7]

3) Applicability of Genially Assisted Interactive Learning Media

Based on the teacher's response questionnaire obtained a percentage score of 95% with a very good category, while for the student response questionnaire obtained a percentage score of 92% with a very good category. This statement is the same as research that has been done [12] with the title "Development of Genially Media on the Material Volume of Cubes and Beams in Elementary Schools" that this genially media is very feasible to use as a learning media on the material volume of space buildings in grade 5 SD

IV. Conclusion

The development of genially assisted media for simple fractions uses the ADDIE development model which consists of five stages, namely Analysis, Design, Development, Implementation, and Evaluation. The genially assisted interactive media containing simple fraction material contains material, tips and tricks, ice breaking, practice questions and games. The validity of this genially assisted interactive learning media with the results of validation by media experts I gave a percentage of 81% with a very valid category. While validator II gave a percentage of 97% with a very valid category. Material expert validation was also carried out by 2 lecturers with validator I getting a percentage of 95% with a very valid category and validator II a percentage of 97% which is included in the very valid category. The applicability of genially assisted interactive learning media based on teacher response questionnaires obtained a score of 76 out of a total score of 80 with a percentage of 95% with a very good category, while for the student response questionnaire obtained a percentage of 92% with a very good category.

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