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Development of Digital Flashcards to Improve Fraction Counting Skills of Students of SDN 11 Kurao Pagang

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Abstract

This research aims to develop digital flashcard media to enhance the fraction calculation skills of fifth-grade elementary school students. The development method used is Research and Development (R&D) following the 3D development model (Define, Design, Develop). The data collection instruments used include documentation, assessment formats, and questionnaires. The techniques used for data collection in this research involve material validity questionnaires, media validity questionnaires, and student practicality questionnaires. Based on the assessment results from the material validators, the material validation score was obtained at 99.28%, categorized as 'Very Valid', while the media validation score from the media validators was 89.68%, also categorized as 'Very Valid'. After the media was declared valid and feasible, it was tested on 47 fifth-grade elementary school students, achieving a practicality score of 99.78%, categorized as 'Very Practical'. These assessments indicate that the digital flashcard media is suitable for the learning process to enhance students' fraction calculation skills.

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1. Introduction

The curriculum used in education in Indonesia today is the Merdeka Curriculum. The main characteristics of the Merdeka Curriculum involve project- and problem-based learning in order to develop soft skills and character in line with the Pancasila learner profile (Wahyudin, 2024). However,

the implementation of the Merdeka Curriculum still has problems that often arise in elementary schools, especially in the learning process, namely children who have entered elementary school are still at risk of staying in class or dropping out of school, one of the causes of which is difficulty in learning to count. This is in line with Hartati's (2016) opinion, that the problems that occur in elementary school students revolve around problems in reading, writing and arithmetic skills.

Numeracy is the child's ability to process numbers related to addition and subtraction. Numeracy is a part of mathematics that is needed to develop numeracy skills that are indispensable for everyday life, especially the concept of number which is one of the foundations for the development of mathematical abilities and readiness to attend basic education. The same opinion is also expressed by Susanto (2011), that the ability to count is the ability of every child to develop their skills.

Based on observations and interviews conducted by researchers on September 30, 2024 with Mrs. Rita Triyeni S.Pd and Mrs. Susilawati S.Pd as homeroom teachers of SDN 11 Kurao Pagang, it was found that the Mathematics learning process carried out in the classroom was not optimal. This can also be seen from the learning outcomes of students who have not met the learning completeness in Mathematics. The value of learning completeness in Mathematics is 80. From the results of the daily test of fraction material in Mathematics, it is known that the average score of grade V students is 62.78. The average daily test score of students has not met the learning completeness score.

The low learning outcomes above are an indication that learning has not been effective. There are several factors that cause students' numeracy skills to be low. The lack of teacher creation and innovation in providing material so that students become easily bored and do not pay attention to the explanation from the teacher is one of the causes of low literacy numeracy skills (Maziyah & Zumrotun, 2024). This is in line with research conducted by Sulfemi (2018), where the results obtained are that the use of inappropriate learning methods by teachers, for example learning that is more inclined to teacher activities than student activities, can make students become passive individuals in participating in learning activities.

Seeing this, one solution that can be provided is to use simple learning materials, one of which is with digital flashcard learning media. The utilization of flashcard media as learning media to improve counting skills has also been carried out by previous studies. Research conducted by Sari et al., (2023), that etomathematics-based flashcard media can improve students' understanding of basic math concepts. Research by Fitriani (2023) which obtained the results that flashcard media is effectively used to improve students' understanding of the concept of multiplication in Mathematics subjects.

2. Research Methods

This type of research uses Research and Development (R&D) research. According to Sugiyono (2021), Research and Development is a research method that has the aim of producing a product. Development research is a systematic study to design, develop, and evaluate programs, processes and learning outcomes that must meet consistency and effectiveness criteria.

This research uses the 3D development model which is a modification of the 4D model from Thiagarajan et al. (1974). The 3D development model consists of Define, Design, and Develop. Define is the collection of data from various sources in accordance with the information needed, Design is the activity of designing a Mathematics learning program on fraction material to improve students' numeracy skills, and the next activity is Develop which is the activity of developing learning. This research was only conducted up to the Develop stage because researchers did not aim to determine the effectiveness of the products that had been developed.

Data collection instruments in this research are documentation, assessment format and questionnaire. The data analysis techniques used in this research are qualitative techniques and

quantitative techniques. The test subjects in this study consisted of two groups of validity test subjects and practicality test subjects. The validity test subjects consisted of material validators who were Mathematics teachers at SDN 11 Kurao Pagang and media validity test subjects who were lecturers of the Department of Curriculum and Educational Technology. The subject of the practicality test was grade V students of SDN 11 Kurao Pagang with a sample of 47 students.

a. Material and Media Validity

Validity here is to test the feasibility of the learning media developed and test the suitability of the media with the material. The expert validation questionnaire answers use a Likert scale, the variables measured are translated into variable indicators. The Likert scale used consists of five categories. The calculation of the final value of the questionnaire data was analyzed using the formula from (Riduwan & Sunarto, 2012) as follows:

$$NA = \frac{PS}{SM} \times 100\%$$

Description:
NA: Final grade
PS: Score acquisition
SM: Maximum score

b. Practicality Test

The practicality of the media was determined by drawing conclusions from the responses given by students to the statements in the questionnaire. The calculation of the final value of the questionnaire data was analyzed using the formula from (Riduwan & Sunarto, 2012) as follows:

$$NA = \frac{PS}{SM} \times 100\%$$

Description:
NA: Final grade
PS: Score acquisition
SM: Maximum score

3. Results and Discussion

1. Define Stage

The activities in this stage consist of five stages including:

a. Front-end Analysis

The initial findings analysis stage aims to determine the basic problems faced in learning grade V Mathematics at SDN 11 Kurao Pagang so that learning media development is needed. Based on observations made, the problem was found that there were student learning outcomes that had not met learning completeness in Mathematics subjects. The low learning outcomes of students' fractions are an indication that learning has not been running effectively which is caused by the limitations of the learning media used, the teacher who dominates more in the learning process, and the learning media used by the teacher is only a book, causing students to feel bored.

b. Learner Analysis

This learner analysis is in line with the initial analysis. Based on the results of observations that have been made at SDN 11 Kurao Pagang, the analysis of learners is carried out by analyzing the developmental stages of elementary school students in accordance with Jean Piaget's developmental theory. Based on the analysis conducted, the characteristics of students at SDN 11 Kurao Pagang include learning while playing.

c. Task Analysis

Details of the task analysis for the subject matter to be developed in this digital flashcard is fraction material. The task included in the development is a quiz.

d. Concept Analysis

At this stage researchers identify, compile and connect the concept of learning strategies with the subject matter that will be given to students through digital flashcard media. The results of discussions with Mathematics teachers in class V found the material to be developed for digital flashcard media, namely fractions. In this material students are required to be able to solve problems related to the addition and subtraction operations of ordinary and mixed fractions.

e. Specifying Instructional Objectives

The activity at this stage is the formulation of learning objectives based on the basic competencies listed in the independent curriculum on fraction material. The learning objectives on fraction material are that students can solve problems related to the addition and subtraction operations of fractions.

2. Design Stage

This initial design stage is the stage of designing digital flashcards with fraction material using Microsoft Power Point software designed. The steps for making digital flashcards on fraction material for class V at SDN 11 Kurao Pagang are as follows:

a. Creating a Flowchart

Flowchart is a diagram that displays steps or processes using symbols and arrows that connect them. The flowchart form of this digital flashcard media is as follows:

Figure 1. Flowchart of Digital Flashcard Media

b. The procedure for making learning videos on digital flashcard media using Canva software. The steps are as follows:

1) The first step is to open the Canva software on the Google web page, and select the video menu.

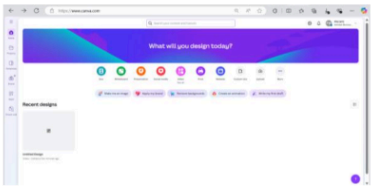


Figure 2. Canva Software Home Page

2) Add a background to each work page.

Figure 3: Adding a Background to the Opening Page

3) After adding the background, next add the video on the work page.

Figure 4: Adding a Video to the Work Page

4) Next, add text to the work page.

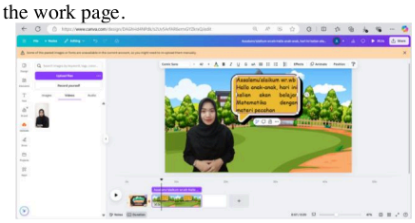
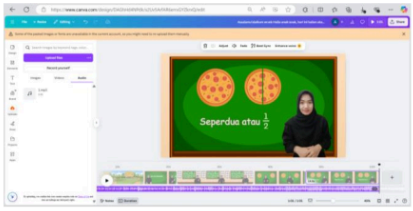


Figure 5: Adding Text

5) Add audio/music to a work page



Adding Audio/Music to the Work Page

The final results of the learning media products developed are as follows:

1) Opening Page

Figure 7. Opening Page

2) Main Menu Page

Figure 8. Main Menu Page

3) Instructions for Use page

Figure 9. Instructions for use page

4) Developer Profile Page

Developer Profile Page

5) Learning Objectives page

Figure 11: Learning Objectives page

6) Material Page

Figure 12. Material Page

The material page consists of 3 material subtheme cards that can be selected, including: 1) General form of fractional numbers; 2) Ordinary fractional numbers; 3) Mixed fractional numbers.

7) Sub Material Page I

Figure 13. Sub Material Page I

8) Sub Material Page II

Figure 14. Sub Material Page II

This sub-material II page has several cards to choose from.

9) Sub-Matter Page III

Figure 15: Sub-Matter Page III

This sub-material II page has several cards to choose from.

10) Quiz Page

Figure 16. Quiz Page

11) Learning Video Page

Figure 17: Learning Video Page

3. Develop Stage

The third stage in the 3D development model is Develop. This stage is carried out to obtain a valid and practical product. This stage consists of several stages, namely the validity test obtained from the assessment of experts in the field of media and material. The next stage is the practicality test which is obtained from the students' responses when using this digital flashcard media. The process of this development stage is:

a. Validity Test

1) Material Expert Validity

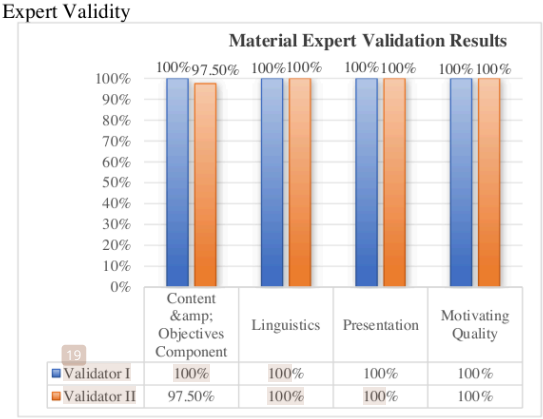


Figure 18: Graph of Material Expert Validation Results

The calculation results get an overall percentage of 99.28% with the category "Very Valid". From this assessment, it can be interpreted that this digital flashcard media is very feasible to use in the process of learning activities.

2) Media Expert Validity

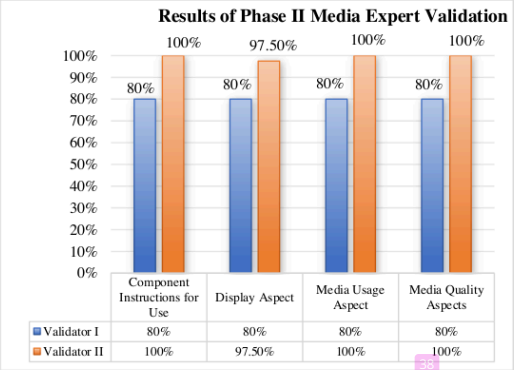


Figure 19: Graph of Media Expert Validation Results

Based on the results of stage II validation, the overall average percentage result is 89.68% with the category "Very Valid".

b. Student Practicality Test

The practicality test was conducted to find out and assess how students responded to the digital flashcard media that had been developed. This practicality test was carried out by giving an assessment questionnaire to students.

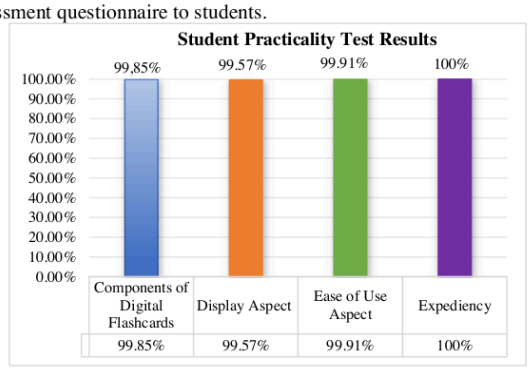


Figure 20: Graph of Student Practicality Test Results

Based on the results of the practicality of student assessment of digital flashcard media, the overall average percentage is 99.78% with the product category "Very Practical", it can be concluded that digital flashcard media of fraction material for class V is practical to use as a learning media in Mathematics class V SDN 11 Kurao Pagang.

3.2 Discussion

The media developed is digital flashcards in grade V Mathematics subjects with fraction material. The research conducted by researchers is a type of Research and Development (R&D) research or research and development which is a research approach to produce new products or

improve existing products using one of the development models, namely the 3D model (Define, Design, Develop).

Digital flashcard learning media is one of the learning media that uses technology in the learning process. In terms of presentation, digital flashcards are displayed attractively with the help of technology that can attract students' attention to learn more enthusiastically, this can make it easier for students to understand the content of learning materials and can improve the ability to count fractions. This is also in line with the opinion of Sari & Nurjanah (2020) that learning media that is interesting for children has several benefits, one of which is to encourage children to learn.

The results of the material expert validator, obtained validation results with an average value of 99.28% with the category "Very Valid". Based on the assessment results from the material expert validator, the material used in digital flashcard media has been declared valid for use in the learning process. Based on the assessment results of media expert validators, the validation results were obtained with an average of 89.68% in the "Very Valid" category.

After the validity test is carried out, then the practicality test of the media that has been developed is carried out. The practicality test of digital flashcard media has been carried out to students and obtained an average score of 99.79% in the "Very Practical" category. The results of the practicality test of digital flashcard media that have been tested on students are obtained from aspects of digital flashcard components, display aspects, aspects of ease of use of media, and usefulness.

Based on this description, it can be concluded that the digital flashcard learning media on grade V fraction material developed is suitable for use in the learning process and becomes one of the alternative learning media for teachers and students because it meets the media eligibility criteria and can be used anywhere and anytime.

5. Conclusions and Suggestions

The results of research on the development of digital flashcard media with fraction material to improve the ability to count fractions of grade V students of SDN 11 Kurao Pagang that have been carried out show that the development of digital flashcard media using the 3D development model is declared valid and practical for use in the learning process. This can be seen from the results of expert validation, where material expert validation obtained a result of 99.28% with the "Very Valid" category, and media expert validation obtained a result of 89.68% with the "Very Valid" category. Meanwhile, the development of digital flashcard media is also declared very practical which can be seen from the results of student practicality tests with an average percentage of 99.78% with the "Very Practical" category.

Based on the above conclusions, the following suggestions are proposed: (1) digital flashcard media in Mathematics subjects for grade V can be used by teachers and students as learning media to increase student motivation and interest in learning and can improve students' fraction counting skills. (2) teachers should be able to create and develop various creative and innovative learning media. (3) the development of digital flashcards as learning media is expected to be a reference for further research.

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