MULTIPLICATION AND DIVISION (MnD) BOARD MEDIADEVELOPMENT TO INCREASE THE MULTIPLICATION AND DIVISIONCALCULATION ABILITY OF CLASS III ELEMENTARY SCHOOL STUDENTS

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ABSTRACT

This study aims to produce learning media in the form of Multiplication And Division (MnD) boards to improve the ability to calculate multiplication and division of third grade students of SD Negeri 6 Sumerta which is feasible to be applied in classroom learning. This research was a development research using the ADDIE model which consists of five stages namely analysis, design, development, implementation, and evaluation. The research subjects consisted of 2 media experts, 2 material experts, and users consisting of 34 students and 2 teachers. While the object of this research included the validity of Multiplication and Division (MnD) board media to improve the ability to calculate multiplication and division of mathematics. The data collection instruments used were media and material validation sheets, media practicality questionnaires, and multiplication and division tests. The research data were analyzed using quantitative descriptive analysis techniques. The results showed that the media validity test got a result of 0.86 with very high criteria, then the results of the material validity test got a result of 1.00 with valid criteria, the results of the practicality test got an average score of 92.5% with very practical criteria, then the results of the effectiveness test in the form of student calculation ability scores of 91.24 with very good criteria. The conclusion of this study was that the Multiplication And Division (MnD) board media developed has met the criteria for feasibility for use in learning mathematics and was effective in improving the ability to calculate multiplication and division of third grade students of SD Negeri 6 Sumerta.

Keywords: Multiplication and Division (MnD) board, ability to calculate multiplication and division, mathematics.

1. INTRODUCTION

Law No. 20 of 2003 on the national education system explains that education is "aconscious effort to create learning and an environment that is well-planned and effective for process and enjoyable so that students can actively develop their potential have religious spiritual strength, self-control, personality, intelligence, noble character, and the skills required for themselves and their community. Education is a basic, planned effort to prepare students through learning activities in order to produce superior and high-quality students. Primary school education is formal education that aims to develop basic skills and abilities in order to prepare students for further education. Quoted from the Big Indonesian Dictionary Indonesia (KBBI), education is a process of changing the attitudes and behavior of

a person or group in an effort to mature humans through teaching and training. In addition, education refers to the idea of changing the way a person thinks from not knowing to knowing so that they can apply that knowledge in their daily lives. One of the basic skills that must be mastered by students in the 21st century is the ability to calculate, which is obtained from mathematics lessons. This is because almost all aspects of students' daily activities involve calculation, for example playing, shopping, and even other learning activities require a context of calculation. Therefore, attention to mathematics is very important. Mathematics is a compulsory subject taught in educational institutions, including elementary schools. Mathematics plays an important role in various disciplines and develops human thinking (Upu, 2017). Mathematics is an exact science that studies calculations that must be proven correct. Mathematics is a discipline that has developed through the long process of human civilization on this earth (Manpaat, 2010). A teacher must have creativity in the use of learning media in accordance with the needs and characteristics of students to increase student engagement in mathematical calculations. So, basically, mathematics is a field of study whose truth can definitely improve students' ability to think logically, critically, and practically in solving problems encountered in daily life. Inappropriate learning techniques in the learning process, as well as the suboptimal application of mathematics in daily life, are among the factors contributing to students' low calculation skills (Heriyari & Munasiah 2022).Deepening students' mathematical calculation skills at this time must be done intensively, because calculation skills are the foundation for students to understand the context of Deepening students' mathematical calculation skills must be intensively pursued at this time, because calculation skills are the foundation for students to understand the basic context of mathematics in calculation. The difficulty of instilling a basic understanding of numeracy skills to students in elementary school causes the learning process to be difficult to carry out or continue as From the results of tests conducted on October 22, 2024, mathematics learning in grade III of Sumerta 6 Public Elementary School, especially on multiplication and division material, obtained an average score of 57.05%. This result is far from the Learning Objective Mastery Criteria (KKTP) of 75. Only 15 students out of 34 students met the KKTP. This is because many students still do not understand how to calculate multiplication and division, have low calculating abilities, lack interest in calculating, and make mistakes during the calculation process, which prevents them from getting the right answers and ultimately leaves them confused and bored. From the results of interviews conducted with the homeroom teacher of class III at SD Negeri 6 Sumerta, Mrs. Ni Putu Devi Anggarini, S.Pd., M.Pd., on October 15, 2024, it was found that most students did not understand how to multiply and divide in mathematics, due to several reasons, one of which was that when teachers were conducting learning activities, they still used the lecture method and only used the students' textbooks .Based on the above problems Simply explaining that multiplication is repeated addition and division is repeated subtraction causes students to feel bored and tired of searching for the answer. Therefore, a medium is needed to improve students' multiplication and division skills, namely a concrete medium that makes it easier for students in the process of calculating, especially in multiplication and division. One medium that can overcome this problem is a counting board.

According to the results of research by Hendri (2023) entitle Development of Smart Multiplication Board Media in Mathematics Learning for Second Grade Students, the results of research on the development of Smart Multiplication Board media have met the criteria of several experts. The smart multiplication board is effective in improving the ability of multiplication of students with an average score of 80.708%. According to Sulkhana (2022) with the research title "Development of Media. Dakotar (Smart Mathematics Dakon) Material on Units of Length and Units of Weight to Improve the Activeness and Ability of Calculation Skills of Fourth Grade Students at SDN Gogodeso 01." The results of this study include material expert validation obtained a percentage of 86% with the criteria of highly valid. Tusya (2023) with the research title "Development of Smart Multiplication Board

Media Based on the Montessori Method for Third Grade Elementary School." The validity results of the smart multiplication learning media based on the Montessori method as a whole obtained a score of 87% with a category of highly valid.

2. RESEARCH METODOLOGY

The method used in this study is the research and development method or Research and Development (R&D). R&D research is a research method that is widely adopted by the academic world today to design and test the effectiveness of products. The development research model used is ADDIE (Analyze, Design, Development, Implementation, Evaluation). The ADDIE model is a general and relevant development model used in development.

The ADDIE stages can be seen in the stages of the model in Figure 3.1 ADDIE development.

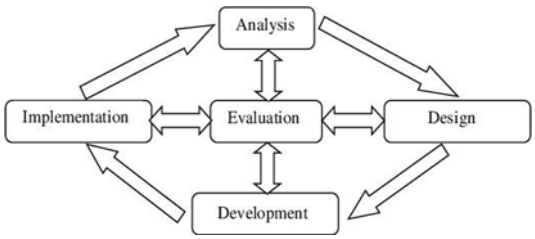

Figure 3. 1 Stages of the ADDIE Development Model
Source: Tegeh, 2014

This Multiplication and Division Board (MnD) media was created using concrete boards to facilitate user usage. The steps in researching the development of the Multiplication and Division Board (MnD) media followed the ADDIE development model. The stages of developing the MnD Board media were analyze, design, development, implementation, and evaluate.

Analysis At this stage, researchers began to conduct analyses based on the needs of MnD Board media development, exploring the feasibility and requirements for development. The stages carried out by researchers included three things, namely: needs analysis, curriculum and material analysis, and environmental analysis.

Design At this stage, researchers begin to design the Multiplication and Division (MnD) Board media to be developed in accordance with the results of the analysis conducted previously. Then, at this stage, they begin to determine the elements needed to develop MnD Board media for III of elementary school. They determine the software and hardware to be used. The first design process carried out at this stage is to determine the software, which refers to the applications and websites used in creating interactive media products. Meanwhile, hardware refers to the tools used to access the links to interactive media product websites. In this case, the researcher designed a multiplication and division board teaching aid. After designing, the researcher determined the materials and tools to be used in designing the Multiplication and Division (MnD) board media, and also prepared the multiplication and division material for use with the Multiplication and Division (MnD) board teaching aid. Development At the development stage, activities are carried out to create products based on the designs that have been made. The final result of this stage is a Multiplication and Division Board Media (MnD) with mathematical content on multiplication and division that will be tested. This stage is the development stage.

Implementation During the implementation stage, researchers will test the product with several parties, namely experts and teachers at the schools referred to as research sites. At this stage, the results of the product that have been validated by validators at the schools used by researchers as research sites will be

applied to verify the feasibility of the Multiplication and Division Board (MnD) developed prior to implementation. After implementation in learning, the product is tested for practicality by teachers. Next, the product is tested on students to assess its effectiveness in improving students' multiplication and division skills. Evaluation At the evaluation stage, an evaluation is carried out in the form of reviewing the overall product development results and making final improvements to the Multiplication and Division Board (MnD) developed based on input from validators (experts and practitioners).

3. RESULTS AND DISCUSSION

This development product was tested for feasibility on third-grade students at SD Negeri 6 Sumerta in the 2024/2025 academic year in the even semester. This chapter presents the results of the development, including the design of the media developed, the results of validity, practicality, and effectiveness tests of the learning media product developed. The Multiplication and Division (MnD) board media was developed with the aim of improving the multiplication and division skills of third-grade elementary school students.

This Multiplication and Division (MnD) board media was developed using the ADDIE model, which includes 1) Analysis, 2) Design, 3) Development, 4) Implementation, and 5) Evaluation.

1) Analyze Stage

a. Results of Student Needs Analysis

Based on the observations conducted, it was found that students' interest in and ability to calculate are still relatively low. This was observed from the results of teaching and learning activities in the classroom and it was also found that most students still achieved low results. This was caused by several factors, one of which was that teachers still using the lecture method and only utilizing student textbooks, the use of teaching media that is not very interesting, explaining the material only using a blackboard, which causes students to get bored quickly, resulting in students' arithmetic skills still being relatively low. Based on the analysis of student needs above, the development of the Multiplication and Division (MnD) board is expected to help improve students' calculation skills in mathematics, especially in multiplication and division. One of the factors for success in the learning process is the use of media that is appropriate for learning and can be applied in a concrete manner, so that students are able to understand the material being taught.

b. Curriculum and Material Analysis

The purpose of this curriculum and material analysis is to prove that the media developed is in accordance with the material in the independent curriculum. The purpose of this curriculum and material analysis is to prove that the media developed is in accordance with the material in the independent curriculum. In the development of the Multiplication and Division (MnD) board

c. Results of Environmental Analysis

This stage involves analyzing the condition of the school in terms of its readiness to support the development of Multiplication and Division (MnD) board media. Facilities refer to the equipment used in learning books and stationery by students, while infrastructure refers to public facilities provided by the school, which in this case is the classroom. the material used is mathematical sentences and calculations.

2) Design Stage

Product specifications include components contained in the Multiplication And Division (MnD) board media and the information presented therein. At this stage, mapping of the components of the Multiplication And Division (MnD) board game media is carried out, including the location of the MnD board media, the Multiplication And Division (MnD) board instruction manual, and the tools used.

3) Development Stage

This stage is the development stage, where activities are carried out to create a product based on the design that has been made. The result of this stage is the creation of a learning medium, namely the Multiplication and Division (MnD) board, to improve students' multiplication and division skills. The following is a preview of the results of the MnD board development.

The MnD board has an attractive design with a combination of colors that are not too striking. At the bottom of the MnD board, there is a guide on how to use the MnD board.

4) Implementation Stage

The validity assessment stage of the Multiplication and Division (MnD) board media was carried out by lecturers who are experts in the subject matter and media experts. The next stage was to test the product with teachers and students. The purpose of testing the product with teachers was to assess its practicality, while testing with students was to assess the effectiveness of the Multiplication and Division (MnD) board media. The results of the product testing by media experts and subject matter experts are as follows.

Subject matter expert validation is a stage to determine the suitability of the product in terms of the material presented. The subject matter expert test was conducted using a questionnaire with a PAP assessment on a scale of 5, which produced scores and suggestions for further improvement of the material in the developed product. The data obtained was then processed using Aiken's V analysis technique through Microsoft Excel. The summary of the media validity test results is as follows.

Table 1. Summary of Material Expert Test Results

Item	Expert Assessment		S1	S2	∑s	n(c-1)	v	Ket
	I	II						
Item 1-13	55	61	42	48	90	104	0.86	Very High

Based on the results obtained from two experts/lecturers, the overall validity score of the Multiplication and Division (MnD) board material was 0.86, which is considered very high. Therefore, the Multiplication and Division (MnD) board material can be accepted without revision and used in the learning process. According to Nasrulloh (2024), the purpose of using media in the classroom is to support and assist teachers in presenting material to students, conveying information, and supporting the learning process so that the intended message is conveyed correctly and appropriately.

Media expert validation is a validation stage that serves to determine the level of product feasibility in terms of media as a supporting medium inquality and engaging learning activities. The media expert test uses a questionnaire instrument with a PAP assessment on a scale of 5, which will produce scores and suggestions for further use in improving the product. The data obtained was then processed

using Aiken's V analysis technique through Microsoft Excel. The summary of the media validity test results is as follows.

Table 2. Summary of Media Expert Test Results

Item	Expert Assessment		S1	S2	∑s	n(c- 1)	v	Ket
	1	2						
Item 1-10	43	46	33	36	69	80	0.86	Very High

The results of media validation on the multiplication and division board (mnd) media obtained a validity index of 0.86 with very high validation criteria without revision, making it suitable for use in the learning process. According to (maflikha, 2020), learning media is very important because it brings joy and excitement to students and renews their enthusiasm, helps to consolidate knowledge in their minds, and brings lessons to life. Hariyanti (2023) suggested that the calculation board media could be used as one of the media to improve students' calculation skills. In addition, the calculation board media could be used according to the needs of the school.

Practicality testing is a testing stage that serves to determine the practicality level of the developed product. Practicality testing is conducted by two practitioners, namely The homeroom teacher of class III at SDN 6 Sumerta was practitioner I and the homeroom teacher of class III at SD 7 Sumerta was practitioner II. Based on the results obtained from practitioner I, the score was 100%, and practitioner II obtained a score of 85%. The average percentage obtained was 92.5%. Therefore, from the data, it can be concluded that the Multiplication and Division Board (MnD) is very practical in learning.

The homeroom teacher of class iii at sdn 6 sumerta was practitioner i and the homeroom teacher of class iii at sd 7 sumerta was practitioner ii. Based on the results obtained from practitioner i, the score was 100%, and practitioner ii obtained a score of 85%. The average percentage obtained was 92.5%. Therefore, from the data, it can be concluded that the multiplication and division board (mnd) is very practical in learning.

Then, to measure the level of effectiveness of the multiplication and division (mnd) board, a trial will be conducted on 34 third-grade elementary school students. Students are asked to fill out a test sheet with 10 questions in accordance with the indicators of the mathematical calculation ability test. The product effectiveness test was conducted to determine the effectiveness of the developed multiplication and division board (mnd) media. The effectiveness test results can be seen from the results of the multiplication and division tests conducted in the third grade of sumerta 6 public elementary school. At this stage, final improvements were made based on input or comments from expert assessors with the aim of determining the success of the multiplication and division board (mnd) media as seen from the data collected during the implementation stage. The evaluation in this study was conducted to measure the success of the product, including product validation, Product practicality, and product effectiveness. According to aurelia (2024), one of the things that plays an important role in learning is the use of learning media. Learning media is an important aspect in the educational process because it can increase the effectiveness and efficiency of material delivery.

4. CONCLUSION

The development of Multiplication And Division (MnD) board media using the ADDIE development model has been carried out in third grade elementary school mathematics learning. The validation results show that the media and material

received a very good rating, including media validity of 0.86 with very high validity criteria and material validity of 0.86 with very high validity criteria. The practicality of the Multiplication and Division (MnD) board media development product received an average score of 92.5% with a very practical rating. The effectiveness test results for the Multiplication and Division (MnD) board media development product received an average score of 91.24 with a very good rating. Based on these results, the Multiplication and Division (MnD) board is suitable for use in mathematics lessons in Grade III at Sumerta Public Elementary School 6.

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