

DEVELOPMENT OF MULTIPLICATION BOARD TEACHING AIDS FOR THE INTEREST IN CALCULATING MULTIPLICATION OF GRADE III ELEMENTARY SCHOOL STUDENTS

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Abstract

This research was conducted because there are still many grade III students who have a low interest in counting in mathematics lessons, especially in multiplication material. The purpose of this study is that researchers want to help students increase interest in counting in mathematics multiplication material by developing learning media in the form of multiplication boards that can meet the needs of grade III students of SDN Baru 03. The method used in this study is Reseach and Development (R&D) using the ADDIE model (Analyze, Design, Develop, Implement, and Evaluate). Experts and grade III students filled out questionnaires used in data collection. The participants of this study were grade III students of SDN Baru 03 using a small group of 5 students getting a percentage of 94% and a large group of 30 students getting a percentage of 91%, both showing very decent categories. In addition, there are 2 media experts who get a percentage of 88% and 100% with a very decent category. For material experts, it gets a percentage of 92% with the category very worthy of use. It can be concluded that the multiplication board media is very feasible to use, especially for grade III students of SDN Baru 03 in the Mathematics lesson of multiplication material.

Keywords: *Multiplication Board, Interest Numeracy, Multiplication*

Abstrak

Penelitian ini dilakukan karena masih banyak siswa kelas III memiliki minat berhitung pada pelajaran matematika yang rendah, terutama pada materi perkalian. Tujuan dari penelitian ini yaitu, peneliti ingin membantu siswa dalam meningkatkan minat berhitung pada pelajaran Matematika materi perkalian dengan mengembangkan media pembelajaran berupa *multiplication board* yang dapat memenuhi kebutuhan siswa kelas III SDN Baru 03. Metode yang dipakai dalam penelitian ini adalah Reseach and Development (R&D) dengan menggunakan model ADDIE (*Analyze, Design, Develop, Implement, dan Evaluate*). Para ahli dan siswa kelas III mengisi angket yang digunakan dalam pengumpulan data. Partisipan penelitian ini adalah siswa kelas III SDN Baru 03 dengan menggunakan kelompok kecil sebesar 5 siswa mendapat persentase 94% dan kelompok besar 30 siswa mendapat persentase 91% keduanya menunjukkan kategori sangat layak. Selain itu terdapat dari 2 ahli media mendapatkan persentase 88% dan 100% dengan kategori sangat layak. Untuk ahli materi mendapat persentase 92% dengan kategori sangat layak digunakan. Dapat disimpulkan media *multiplication board* sangat layak digunakan terutama pada siswa kelas III SDN Baru 03 dalam pelajaran Matematika materi perkalian.

Kata Kunci : *Multiplication Board, Minat Berhitung, Perkalian*

INTRODUCTION

Education is one aspect that determines the intelligence of a nation. In the millennial era like today, education occupies a very important position in human development because education is the most important factor in influencing one's character in a better direction

and building a philosophy of life so that it can be used as a guide in living daily life. Education is a process that aims to instill the desire for knowledge and cultivate the ability to acquire it.

One of them is found in the subject of Mathematics, Mathematics is the study of a pattern or way of thinking, an art, language and tools. Mathematics can be said to be a scientific discipline that is able to develop reason, logic, argumentation and ways of thinking and contribute to solving problems in everyday life (Febrianingrum, 2022). Math skills that children need to learn include multiplication. Planting this item takes a long time because it is necessary. For example, students often have difficulty when given as a matter of story. Therefore, there are still many efforts being made to improve the quality of learning, especially mathematics and multiplication materials. These efforts include using the right media.

Learning media serve as tools for delivering educational content and messages to students (Mashuri, 2019). Learning media act as vehicles for transmitting educational information and messages to students. Through these media, students receive the instructional content effectively Mathematics learning process, it is expected to help teachers in improving student learning understanding. Therefore, teachers should incorporate media into every learning process to ensure that the educational goals are met. By incorporating media into the mathematics learning process will help teachers improve student understanding in learning so that learning can develop further and teachers must be able to adjust what media is appropriate and what is suitable for the students they will teach (Fatimah, 2020).

Therefore, researchers provide alternative solutions to enhance students interest in learning and understanding of mathematical multiplication concepts by utilizing *multiplication board* props or multiplication boards that are in accordance with the material presented. So that it can help understand the concept of student multiplication in capturing the material taught in class and make students more interested and invite students to play an active role in the learning process. Thus, to assist students in overcoming difficulties, boredom, and motivation to learn students, a healthy, enjoyable and a competitive learning process is necessary to make students active and creative.

Some previous studies that have examined the development of *multiplication board media*: (1) Tussyadiah (2023) with the title "Development of Smart Multiplication Board Learning Media Based on Montessori Method for Grade III Elementary School". The aim is to assess the validity, practicality, and effectiveness of montessori method-based smart multiplication board learning media. Using the ADDIE research method, the findings indicate that smart multiplication board, based on the montessori approach, meets the criteria of being valid, practical, and effective. (2) Lamuhamad (2022) with the title "Efforts to Improve Understanding of the Concept of Mathematical Multiplication in Building Space through the Application of Class V Multiplication Board Props at SDN 2 Inpres Liang", based on the results of research from the multiplication board declared valid. (3) Azizah et al., (2022) with the title "The Role of Multiplication Board Media on Mathematics Learning Outcomes of Class V Elementary School Multiplication Material". The purpose of this study is based on the formulation of the problem to determine the role of multiplication board media on student learning outcomes. Then the results of the development of the media were declared valid. (4) Nafisah & Furnamasari (2023) "Application of Smart Board Learning Media in Second Grade Mathematics Learning Uptd Sdn 1 Juntinyuat". The application of learning media is necessary for problem solving in the form of questions aimed at getting the right answer. It can be concluded that the media is declared valid and practical.

Multiplication board media is a tool used to convey repeated multiplication material, in the form of a flannel-coated board. Through this learning media, students are required to be active in learning and can improve the learning outcomes of mathematics students multiplication material. According to Hengkang and Hartin (2023), the superiority of this multiplication board prop is to crush students' learning interest because the lessons become more interesting and varied. Through this learning media, students are required to be active in learning and can improve student learning outcomes in mathematics subjects multiplication material. Using real media in the learning process is very important, because students will better understand the material to be delivered (Wahyuni, 2022).

The use of a media, teaching aids, or a method, model in learning will also help interest, activity in students, so that it can be easier for students to understand each of the concepts given well. The benefits of multiplication board props include helping teachers in:

a). Provide clarity of concept; b). Formulate or form concepts; c). Train students in coaching; d). Provide reinforcement of concepts to students; e). Train students in problem solving; f). Train learners in measurement; g). Encouraging students to think critically and analytically, Oktiana in Firda and Lakilo (2022). So that the application of multiplication board media on multiplication material has a positive impact on improving student learning outcomes. Through this learning media, students are required to be active in learning in order to better understand the material to be delivered.

Multiplication is an important mathematical design that should be learned for children after they pursue addition and subtraction operations (Dwiyono & Tasik, 2021). If in the first grade in the lower school there has been a subtraction operation and an additional operation has appeared, so generally this multiplication has appeared in the lower school, namely in the second grade. The meaning of multiplication is an operation to add by many times.

Based on the conclusions above, the most important thing is to help students in cultivating interest in mathematics. Interest is an involuntary concentration that is born willingly and which depends on talent and environment. Interest according to Ngalim Purwanto in Reksa Setiawan (2018) interest directs actions to a goal and is an impetus for those actions. When they see that something will be profitable, they feel interested, when satisfaction decreases, interest decreases. Interest will add excitement to every activity that a person pursues. When children are interested in an activity, their experience is much more enjoyable.

Thus, to overcome and help students not to experience difficulties, boredom, and motivation to learn students, a healthy, enjoyable and competitive learning process is needed that makes students active and creative. With the help of demonstration methods assisted by multiplication board props, it is hoped that the material delivered by researchers can be understood by students. So the author took the initiative to conduct research based on the problems that have been described by developing Multiplication Board learning media in increasing interest in numeracy in grade 3 elementary schools.

METHODS

On May 15-16, 2024, researchers collected data at SDN Baru 03 located at Jalan Gotong Royong, Baru, Pasar Rebo District, East Jakarta City, Special Region of the Special Capital Region of Jakarta, 13790. Participants in the study amounted to 30 people consisting of grade III students of SDN Baru 03. The type of research used in this research is development research or commonly known as *Research and Development* (RnD). This research uses the ADDIE development model in which there are 5 stages. These stages are *Analyze, Design, Develop, Implement, and Evaluate* which is one of the systematic learning design models. In developing multiplication board media refers to the development of ADDIE which is designed systematically at each stage. This is very helpful for researchers in developing multiplication board media . The stages carried out by researchers in the development of multiplication board media use the ADDIE model.

The first stage is to analyze the needs and problems experienced by grade III students of SDN Baru 03. A needs analysis was conducted to address the problems and needs of grade III students at SDN Baru 03. The second stage is after analyzing the needs and problems, the researcher begins to design the product. The design of this product is still conceptual and researchers also make validation sheets and student response questionnaires. The third stage is development, the results of this stage are in the form of products that will be validated by media experts and material experts. After validation, the results will be in the form of suggestions used to help researchers improve media development. The fourth stage is implementation, after the product is validated by two experts, the researcher implements the product that has been developed on students. The implementation trial was carried out on grade III students of SDN Baru 03 with different levels. The last stage is evaluation, this stage researchers receive suggestions and input from media expert validators, material experts, and students. This is done so that the developed product is efficient, effective, and dancing.

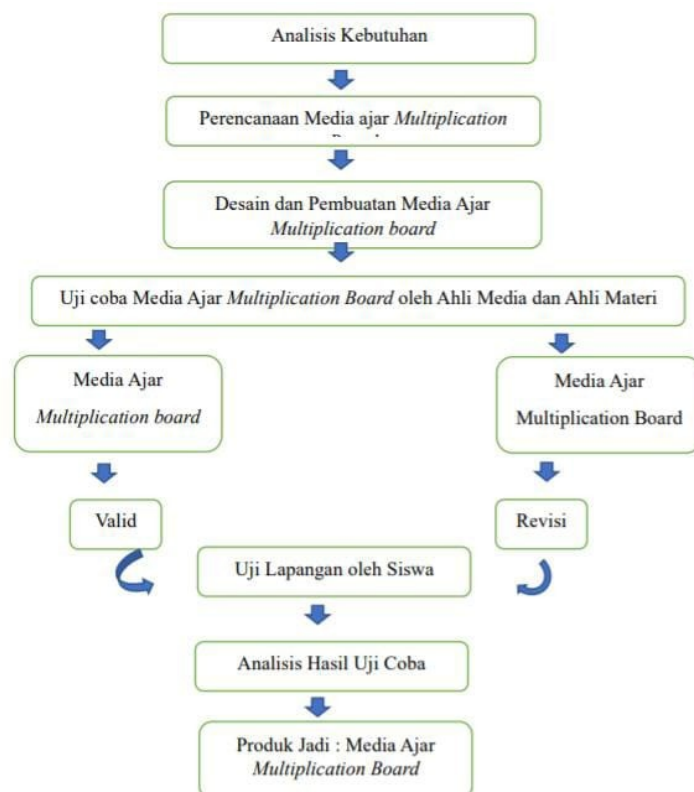


Figure 1. Model ADDIE

Researchers obtained data from the distribution of questionnaires, starting from collecting data for media feasibility through media expert tests, material expert tests, and product feasibility trials for teachers carried out by providing validation questionnaires and questionnaires for teachers. Then the distribution of questionnaires to respondents (students). Activities carried out by researchers in the preliminary research stage are the identification of problems and student needs. Researchers conducted interviews with homeroom teachers of class III SDN BARU 03 as a way for researchers to collect data. Then the researcher consults validators of the developed media to be given suggestions and criticisms in order to correct the shortcomings of the media that the researcher develops. To

$$P = \frac{f}{N} \times 100$$

calculate the results of the product validity analysis obtained from the validation test instrument in the form of a questionnaire containing statement sentences and choice scores. The score given is on a scale of 1-5. How to calculate the validity value is using the following formula:

Information:

P = Final value

f = Score

N = Maximum score

Data obtained from the results of validation The data obtained there are 5 criteria as follows:

Table 1. Product Validity Criteria

Value	Criterion
81-100	Very valid
60-80	Valid
40-60	Enough valid
20-40	Less valid
0-20	Invalid

Table 1 describes the media eligibility criteria for the percentage of results obtained. To analyze the response students can use the following formula.

$$P = \frac{\sum x}{\sum x_1} \times 100\%$$

Information:

= Percentage

= Number of answers of all respondents

= Overall number of ideal scores

100% = Constant

Table 2. Student Response Criteria

Presented	Criterion
85%-100%	Very positive
70%-84%	Positive
50%-69%	Less positive
0%-49%	Not Positive

Table 2 explains the criteria for student response, can be seen from the percentage of results that have been obtained.

The student response instrument also contains choice statements and scores. The choice scores in the student response instrument are as follows.

Table 3. Questionnaire criteria

Criterion	Sco
Excellent	5
Good	4
Not Good	3
Bad	2
Very Not Good	1

Table 3 describes the scoring criteria for each question presented.

RESULTS AND DISCUSSION

This research is a development of *multiplication board media* for the interest in counting in Mathematics lessons for grade III students. In this media explained how to solve multiplication material problems, the difference between my research and previous research is the focus of this research on the Montessori method which is used to see its effect on understanding mathematical concepts from early childhood multiplication material grade III.

This research was conducted to develop *a multiplication board media* that meets the criteria so that it can be implemented in Mathematics subject matter in class III multiplication. In a multiplication board media research conducted by Tussyadiah (2023), Lamuhamad (2022), Azizah et al., (2022), and Nafisah & Furnamasari (2023) concluded that *multiplication board media* is said to be feasible as a learning medium. The novelty distinguishes between previous research and this study, namely the focus on this research is the Motessori method used to see its effect on understanding mathematical concepts from

early childhood, while the focus for the research to be carried out is the Motessori method used to see its effect on increasing the understanding of multiplication concepts in grade III elementary school students.

The media development process goes through several stages, such as expert validation and conducting research to small and large groups. Then it can be seen whether the developed media is suitable for use or not. The media validation process is carried out by 2 experts, namely material and media experts along with student responses. The development of this media uses the ADDIE model and has 5 stages that must be done, namely *analysis, design, development, implementation, evaluation*.

The first stage is This stage researchers analyze the needs and problems experienced by grade III students of SDN Baru 03. A needs analysis was conducted to address the problems and needs of grade III students at SDN Baru 03. Researchers will develop a multiplication board media to increase interest in counting multiplication of grade III students of SDN Baru 03.

The second stage is for researchers to start designing multiplication board media products. The design of this product is still conceptual and researchers make validation sheets and student response questionnaires.

The third stage is design, researchers will develop product designs. The result of this stage is in the form of a product that will be validated by media experts and material experts. After validation, the results will be in the form of suggestions used to help researchers improve media development.

The fourth stage is, researchers implement the products that have been developed in students. The implementation trial was carried out on grade III students of SDN Baru 03 with different levels.

The last stage at this stage researchers receive advice and input from media expert validators, material experts, and students. This is done so that the developed product is efficient, effective, and dancing. This stage is carried out throughout development from design to implementation. The following multiplication *board media* that researchers have developed as follows:



Teaching Aids For The I



Figure 2. Sanding boards

Figure 3. Iron Mounting

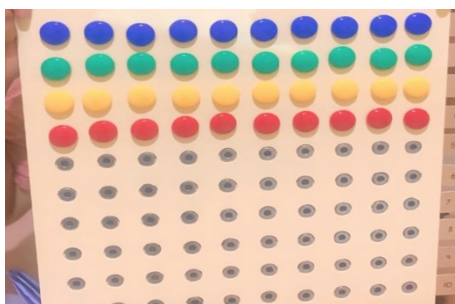


Figure 4. Pre-designed boards

The *multiplication board* media that I developed in this study is square in shape made of plywood measuring 50 cm x 50 cm with a magnetic circle and the arrangement of numbers above and next to the numbers arranged are 1 to 9. To demonstrate this *multiplication board* media, dice are used and the numbers that come out of the dice will be affixed to the top and sides, then the numbers that come out are magnetized to meet the number of numbers that come out.

After the creation of the media, the next stage is the validity test stage, at this stage it is carried out to assess the feasibility level of the developed media. This stage is assessed by material experts, media experts and student responses.

Table 4. Media Expert Validation (first)

Aspect	Score	Criteria
Display Aspect Physical media	90%	Very Worth It
Media supporting aspects	87%	Very Worth It

Table 5. Media Expert Validation (second)

Aspect	Score	Criteria
Display Aspect	100%	Very Worth It

Physical media			
Media supporting aspects		100%	Very Worth It

Based on tables 4 and 5, the validation results of 2 media experts covering 2 aspects, in the aspect of physical appearance of the media get a percentage of 90% and 100%, and in the supporting aspect of the media get a percentage of 87% and 100%. So it can be concluded that the results of media validation by 2 media experts get the "very feasible" category.

Table 6. Material Expert Validation

Aspect	Score	Criteria
Suitability of the media to the material	88%	Very Worth It
Language	96%	Very Worth It

Based on table 6 the results of material expert validation include 2 aspects, in the aspect of media suitability with the material gets a percentage of 88%, the language aspect gets 96%. So that the results of validation by the material on the multiplication *board media* get the category "very feasible". It can be concluded from the results of material and media experts said to be "very feasible" to be used in learning Mathematics multiplication material in class III.

This research was conducted on small and large groups at SDN Baru 03. In small groups consist of 5 students, while large groups consist of 30 students. The purpose of this study is to determine the feasibility of *multiplication board media* that has been developed. Instruments in the form of 10 questionnaires covering aspects of media use and aspects of student responses to the media.

Table 7. Small Group Student Response

Aspect	Score	Criteria
Aspects of media	91%	Very Feasible

use		
Aspects of student response	96%	Very Feasible

Table 7 is the result of a small group of 5 students with the results of 91% aspects of media use and 96% aspects of student response.

Table 8. Large Group Student Response

Aspect	Score	Criteria
Aspects of media use	91%	Very Feasible
Aspects of student response	91%	Very Feasible

Table 8 is the result of the response of a large group of 30 students, for aspects of media use got a percentage of 91% and aspects of student responses 91%.

It can be concluded that the responses of students from small and large groups can be said to be "very feasible" to be used in the process of learning Mathematics multiplication material grade III elementary school.

CONCLUSION

Based on the results of the research that has been described, the development of multiplication board media in the Mathematics lesson multiplication material has been carried out in small groups with 5 students and large groups with 30 students in grade III SDN Baru 03 and has been validated by media and material experts. This research multiplication *board media* is said to be very feasible and can be used in Mathematics lessons multiplication material in grade III elementary school.

From this study, it was obtained that the multiplication *board media* that had been validated by 2 media experts got a percentage of 88% and 100% with a very decent category. While material experts get a percentage of 92% with the category very worthy of use. Research conducted on a small group with 5 respondents got a percentage of 94% very feasible and a large group with 30 students in grade III SDN Baru 03 got a percentage of 91%

very decent. Based on the results of material and media expert validation as well as small and large group responses, it can be concluded that multiplication *board media* is very feasible to be used in learning mathematics multiplication material in grade III elementary school.

Here are some suggestions conveyed by researchers, (1) For students, it is expected to help students to increase interest in mathematics subjects through demonstration methods assisted by *multiplication board* props using multiplication board media. (2) For teachers, it is expected to help teachers to further improve various learning, especially *multiplication boards* using multiplication board media against the concept of multiplication. (3) For schools, it is expected to make a useful contribution in developing learning in a better direction through the use of interesting and fun learning media. (4) For researchers, Developing knowledge through research activities and increasing the insight and knowledge of researchers and being able to be a reference for future researchers and can be developed to be more perfect.

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