Educenter : Jurnal Ilmiah Pendidikan
Vol 2 No 2 May 2023
ISSN: 2827-8542 (Print) ISSN: 2827-7988 (Electronic)
Open Access: https://jurnal.arkainstitute.co.id/index.php/educenter/index

Application of multiplication method using multiplication board to elementary school students

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Article Info

Article history:
Received 8th May 2023
Revised 11th May 2023
Accepted 25th May 2023

Keyword:
Multiplication board, Application, Elementary student

ABSTRACT

In order to meet the development of mathematics learning in elementary school children, we find and form media to improve the material to make it easier for students to learn, therefore we create learning media namely "Smart Multiplication Board". which serves to improve teaching methods and facilitate teachers in pedagogy. This research is included in the type of research and development, which is carried out to develop certain products and test the effectiveness of the product. the development example used in this research is the ADDIE development example. Based on the results of observations that have been made during implementation research, students' enthusiasm for using the learning media that has been developed is very good, it can be seen that students are impatient to use learning media. Math Multiplication Smart Board Learning Media on multiplication material is declared feasible to use based on quality assessments from media experts, material experts and learning experts as well as media feasibility from student and teacher responses. The final product of the learning media of the Math Multiplication Smart Board (Panlintarmatika) is a medium that belongs to the type of visual media.

INTRODUCTION

Mathematics is the science of logic regarding shapes, composition, quantities and concepts related to one another in large numbers and is divided into three fields, namely algebra, analysis and geometry (Maulyda et al., 2019). The objectives of learning mathematics include so that students can explain abilities: understand mathematical concepts, the interrelationships between concepts and apply concepts or algorithms, in a flexible, accurate, efficient, and precise problem solving (Aledya, 2019). One of the mathematics materials taught in elementary schools is addition material, synonyms for the word addition itself are multiplication, multiplication, multiplication, multiplication, captivity. The inventor of the Mathematical Multiplication and Division Method is Abu Sirri. Multiplication is a basic arithmetic process in which a number is multiplied by the number multiplied by it addition is a repeated addition operation (Raji & Korosando, 2022).

According to the Ministry of National Education, the purpose of learning mathematics in elementary schools is to understand mathematical concepts, to mention the interrelationships between concepts, and to apply concepts or algorithms (Mawaddah & Maryanti, 2016). Use reasoning on patterns and properties, perform mathematical manipulations on generalizations, compile evidence, or express mathematical ideas and statements. Solve problems that include the ability to know problems, design mathematical examples, complete examples, and interpret the solutions obtained. Communicating ideas using symbols, tables, diagrams, or other media to express situations or problems. Have an attitude of respecting the use of mathematics in everyday life. (Depdiknas)

Multiplication material cannot be separated from learning mathematics, multiplication itself is very important for participants (Shoifa & Zainudin, 2020). And can facilitate students in calculating. Multiplication is one of the most difficult materials to learn in mathematics, especially in third grade elementary school students. The phenomenon in the field shows that not all students like multiplication material. This is in line with the results of observations that we have carried out in one of the elementary

schools in Palembang. Based on the results of these observations, we found students who did not like multiplication material, not because the teacher was not attractive, but because the material was not understood by students.

To overcome this problem, we need a learning media that can stimulate students' numeracy skills. Learning media is an important element in the learning process, learning media is a learning resource that can help teachers enrich students' insights (Nurrita, 2018). Learning media is also useful for making teaching more interesting, so that it can generate motivation to learn, clarify the meaning of teaching materials, get students more involved, and make learning methods more varied. (Saputra & Pasha, 2021; Suwaib et al., 2020).

The purpose of our observation was to find and shape multiplication material media to make it easier for students to learn. Therefore, we created learning media, namely "Smart Multiplication Board". This Smart Multiplication Board media also functions to improve teaching methods and facilitate teachers in pedagogy. This Smart Multiplication Board is made of art paper and then vinyl. The way to use it is to give a multiplication problem then we explain how to use the media earlier.

Some research that has been done before that using smart multiplication board media is feasible, simple and effective to make it easier for students to get to know multiplication. Media smart multiplication board is a tool used to provide repeated multiplication material (Safitri & Nugroho, 2023). Through this smart multiplication board media, students are required to be active in learning and can enhance what will happen to students' learning in learning mathematics multiplication material. So this research aims to form learning media in the form of smart multiplication smart boards to increase students' learning interest.

Based on the results of the research that we got after making observations, namely that the application of learning using smart multiplication board media is more effective and makes it easier for students to learn. And the smart math multiplication board learning media in multiplication material is declared suitable for use based on the assessment of the quality of media experts, material experts and learning experts and the feasibility of the media from the responses of students and teachers. The final product of the smart multiplication board learning media (panlintarmatika) is media that belongs to the type of visual media.

RESEARCH METHODS

This research belongs to the type of research and development (Research and Development), which is carried out to develop certain products and test the effectiveness of products. The development example used in this study is the ADDIE development example which consists of five steps, Namely Analyze is the process of identifying potentials and problems and analyzing needs, Design is the term for designing the desired learning media.

Term Development is the term for product evaluation by conducting expert validation, one-to-one trials, small group trials. Implementation is the final term in development. Evaluation of this evaluation term is the analysis stage of data acquisition from the pretest and posttest with the N-Gain formula which aims to be able to assess the quality of the smart multiplication board media developed regarding the process and effects of learning, both before and after implementation. The test subjects involved in this study were media experts who are competent in the field of visual design and technical quality of the media. Students are required as those who will play a role in one-to-one field trials, small class up to the implementation stage.

Data collection in the research was carried out using the method of observation, interviews, with research instruments in the form of observation sheets, interviews and materials, and using pretest and posttest techniques. The data obtained in the study were then analyzed using data analysis techniques on the evaluation sheet. Experts were asked to fill in the check marks in each question with the following score conditions: 5 (strongly agree), 4 (agree), three (undecided), two (disagree), 1 (strongly disagree). In the student response questionnaire, respondents were asked to submit "yes" and "no" answer choices. What will happen is that the data will be analyzed using qualitative descriptive data analysis according to interviews and observations and then quantified according to the numbers obtained based on the N-Gain test scores to determine the effectiveness of comic media for reading comprehension skills (Puteri et al., 2022).

RESULTS AND DISCUSSION

The development of a smart multiplication board using the ADDIE model has five stages of development, namely Analyze, Design, Development, Implementation, and Evaluation. The original results of each stage of development are as follows. Term Analysis (analysis) is carried out to describe the causes of the emergence of discrepancies between expectations and reality on the ground. Data collection was carried out by observation in the form of interviews with third-grade elementary school teachers and their students to find out 2 scopes, namely, characteristics about the background knowledge of students' cognitive development during the learning process and the problems encountered and the expected needs. Some of the problems encountered are the learning process in the classroom that has not used media optimally, at least media that can be used as a reference for supporting the 2013 curriculum, the use of learning resources for the learning process is limited in textbooks, and worksheets have not been able to increase students' learning motivation due to the presentation of material that is not too long. The pedagogical method that is generally carried out by teachers is the conventional method, for example the teacher's explanation to students is still fixated on only the available whiteboards, thus making students less enthusiastic about the learning process. In the learning process, not a few students have difficulty understanding multiplication material.

After obtaining the problems and media needs of students, the research then continued in the second development stage, namely media design. The design stage developed for smart multiplication board media is in the form of print media with the mechanism of activity including making the design as attractive as possible so that students have an interest in studying multiplication material.

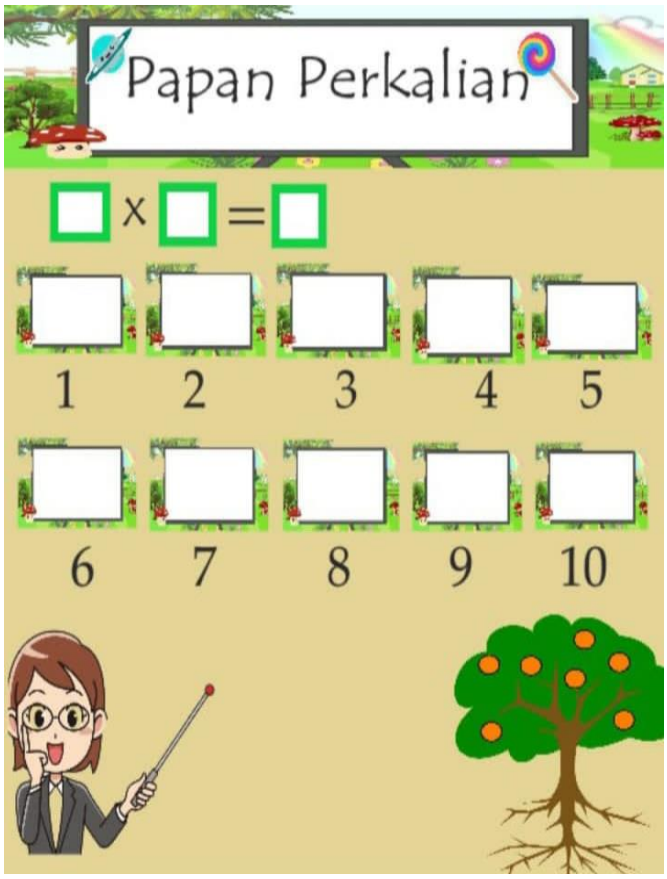

Figure 1. Smart multiplication board media display

The image above is the media that we will display in the form of a smart multiplication board. The third development stage is the term development, in this development stage an evaluation of comics is carried out through two validation terms, namely media experts, and materials, as well as one to one and small group field tests. The original purpose of this assessment is to measure the quality of the product developed before it is implemented on students. The smart multiplication board media can be

said to be feasible if it reaches 80% -100% at the evaluation stage carried out by experts and field tests using instruments in the form of questionnaires and interviews. The data and suggestions provided will be used as material for the improvement of the smart multiplication board media being developed. the first stage of media expert validation will assess the feasibility of the media through 3 aspects namely, visual design, materials, and technical quality.

Table 1. The results of the recapitulation of the validation of experts

Validasi Ahli	Score (%)
Media	80%
Materi	83%
Total	163%
Average Percentage	81,5%

According to the data obtained, it can be observed that the overall validation of the smart multiplication board media received a value of 81.5%, which means it is included in the "Decent" category A qualification criteria for implementation. using repairs made according to suggestions from expert validators, then the initial product is declared feasible and then as the second prototype. The second prototype has been repaired based on validation by media and material experts. Then enter the field test one to one. At this stage the product was tested using the subject of two third grade students who represented groups that would have high, medium and low learning. In this term, the interview instrument is used as a guide for assessing the quality of the media with 8 aspects of the questions asked including clarity of media instructions, font size, colors used in the media, displayed images, presented material, understanding of the material, motivation, and media effectiveness. Furthermore, as a result of the interviews that had been conducted with two students it was found that students gave positive responses to questions about using the "smart multiplication board". as much as 90% of students agreed that the holistic view of the smart multiplication board that was developed was interesting and fostered student motivation to learn and could help students overcome conflicts in the ability to count and multiply. based on the results of data analysis on the third prototype, it can be stated that this product is feasible as a result, no revision is needed and can be continued in the fourth prototype.

To find out more about the feasibility of the smart multiplication board media that was developed, the next stage was a small group field test of 4 students in the third grade. The data collection instrument in the small group field test used a student response questionnaire to the use of smart multiplication board media. In the small class field test, the activities of the students were observed and taught how to use the media, using 7 aspects of the responses displayed including understanding of the material, media attractiveness, instructions for using media, type and size of media, increasing interest and motivating student learning. according to the recapitulation of the results of the questionnaire, student responses indicated that 90% of the responses of the smart multiplication board media developed were feasible to use. seen as long as there will be homogeneous student responses, it shows that students are happy in using smart multiplication board media in the learning process. so that the 3rd prototype does not require revision. Furthermore, the 4th prototype as the 5th prototype which will later be used as a learning medium in the field test term.

After the product validity value was produced, the research was then continued in the fourth term, namely the Implementation stage, which was carried out in order to be able to find out the students' multiplication abilities, understanding the five prototypes that were feasible to implement by preparing a learning environment and student involvement. Smart multiplication board media with multiplication material was tested on 10 third grade students. students who carry out the implementation stage are students who have varying abilities ranging from low, medium and high. Application done using test techniques in the form of pretest before learning takes place and posttest after learning takes place. In the pretest term before distributing the test questions, the researcher conducted an apperception of the students to find out the students' ability to understand the multiplication material. after the pretest is completed the research is then continued in the posttest term. in this case the researcher made direct observations to find out student behavior towards the comic media that would be implemented. The learning process begins with teaching, question and answer and tests.

The fifth development stage is the evaluation stage, which is carried out with the aim of assessing. the quality of the media developed in the form of processes and consequences of learning both before and after implementation. From the effect of using smart multiplication board media in the implementation phase for 3rd grade students, totaling 15 students, it indicates that smart multiplication board media is effective for students' learning abilities in multiplication material. This can be seen from what will happen in the pretest and posttest. This proves that the smart multiplication board media that researchers have developed can have a potential impact on learning outcomes for students' learning abilities in learning mathematics in multiplication material (Puteri et al., 2022).

Based on the original values of media experts, material experts, learning experts, students and learning media teachers, the Smart Math Multiplication Board is a final product that is suitable for use in the teaching and learning process of mathematics in multiplication material for grade 3 elementary school. according to the results of observations that have been made when the research was carried out by the enthusiasm of students in using learning media which has been developed very well, it can be seen that students are impatient to use learning media.

During the learning process students are able to be directly involved in learning, because students are able to operate the media by themselves. This learning media can be used individually or in groups. the students were very enthusiastic when the writer demonstrated the learning media. How to use learning media is very simple because in learning media it is equipped with instructions for using learning media.

CONCLUSION

Based on all the activities carried out, it can be concluded that 1) The impact of learning mathematics by using learning media on multiplication material is that it increases the ability to organize material and manage learning and can make good use of learning time, and increases student learning activity which is quite significant. 2) the use of media in multiplication material will make it easier for children to understand multiplication material. 3) The Multiplication Board learning media is good at Mathematics in multiplication material is declared suitable for use based on the assessment of the quality of media experts, material experts and learning experts and the feasibility of the media from the responses of students and teachers. The final product of learning media Smart Multiplication Board Mathematics (Panlintarmatika) is a media that belongs to the type of visual media.

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