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Development of Mathematics Spin Wheel Learning Media Flat Building Materials for Elementary Students

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ABSTRACT

This study aims to develop mathematics learning on flat shapes using a rotating wheel in elementary school students. Research method that is used is Research and Development (R&D) of the ADDIE development model. This research was conducted in one of elementary school in South Jakarta, this research and development showed the results: 1) The development of a flat shape math wheel media was made based on the needs and characteristics of elementary school students. The design of the mathematics spin wheel learning media that the researchers made is very interesting because it develops innovations including 3D image shapes and various color choices, 2) The validity of the research and development of the math spin wheel media flat shape material has been validated by several expert whose results in average score is 90% with very valid criteria. 3) The level of effectiveness in the research and development of the mathematical rotary wheel media on flat shape materials was tested on a limited pilot trial and extensive trial. In limited pilot trial the researcher got an N-Gain value of 0.4 from the results of 6 students. Furthermore, in extensive trial, the researcher calculated the effectiveness by measuring the comparison of the pre-test and post-test and then calculated using the N-Gain formula and scored 0.82 and was included in the category of high effectiveness (effective). the results and conclusions of this research is flat shape math wheel media could be implemented in elementary school.

Introduction

Mathematics is a subject that is considered difficult by some students, starting from elementary school to university. In mathematics, students are assigned to understand definitions, ways to solve problems, and operate mathematics appropriately. When students have a strong understanding of mathematical concepts, this can be an asset to explore mathematics at a higher education level (Wari, 2021). Mathematics learning in elementary schools' students carry out the learning process at the pre-concrete to concrete stage and towards the abstract stage (Syahputri, 2018). The material for flat shapes in mathematics is a two- dimensional shape that has length and width consisting of squares, rectangles, triangles, rhombuses, parallelograms, kites and trapezoids. Flat shape material in class V

only emphasizes square, rectangle, and triangle shapes. The problem in solving the flat shape material is that students do not understand the material starting from memorizing the area and circumference of the flat shape to solving questions on the flat shape. Learning mathematics in elementary schools needs to be given by teachers to students to instill the ability to think logically, systematically and creatively (Nurfadilah & Hakim, 2019).

This research is supported by several previous studies, including shows the results that the rotary wheel media has advantages, including attractive student interest in learning, involving students in learning activities and this media can be said to be successfully applied in learning. Study showed good results after using rotary wheel media on learning mathematics, and the rotating wheel media can make the students studied become enthusiastic in doing learning. Research gave good results in the development of a turning wheel in mathematics because with this media students would be more interested in learning and more enthusiastic and effective in mathematics learning activities.

Learning media is needed by students to support the learning process so that the goals of learning can be achieved. Rotating wheel media is one of the media that can support students in learning, especially in mathematics, rotating wheel media can improve student learning because with this media students can do learning by playing so students don't feel bored in learning. Based on the results of a preliminary study that researchers conducted related to learning activities and media use, namely the researcher obtained the following data, learning activities at one of state elementary school in Jakarta had carried out face- to-face learning. The use of learning media by class teachers during the learning process for fifth grader at that school, researchers saw that teachers lacked innovation in teaching and researchers saw that there was no learning media that supports students to learn, especially in learning mathematics. The existence of learning media has a very important position in the learning process, so that students more easily understand what is learned and do not feel bored quickly in learning.

Based on the results of observations and interviews that have been conducted, the researcher wants to develop a rotary wheel learning media for learning mathematics in elementary schools. The rotating wheel media is a wheel game (circle) which is arranged with learning mathematics in accordance with the learning contained in class V. This rotating wheel media can be used as a teacher as one of the innovations for the learning process because students can feel happy doing learning while playing and can make students enthusiasm for learning. The researcher made the math wheel media because it saw the basis of the problems in the class where students' math scores were still low in mathematics subject matter of flat shapes. In supporting and deepening researchers to obtain strong data, in this study researchers analyzed needs, interviewed teachers and students and distributed questionnaires. The advantages of the rotary wheel that the researcher made are being able to make students happy in learning, helping the student learning process well, and being able to support students to understand the concept of flat shapes. In this study, the researcher tested the effectiveness of the mathematical spin wheel media by testing the product on a limited, small and medium scale, and the researcher asked the validator team to make corrections about the media. And the output generated from the mathematics rotary wheel is to improve students' mathematics learning outcomes in flat shape material.

Method

This study uses the ADDIE development model. Research and development methods (Research and Development) are methods used to produce a quality product. The

development design in this study the researchers chose to use the Research and Development (RnD) method. The ADDIE development model is a development process consisting of five phases, namely analysis, design, development, implementation, and evaluation (Cahyadi, 2019). In the analysis stage the researcher conducts a needs analysis to ensure that the product is made according to user needs, the design stage the researcher determines the process of making math spin wheel learning media flat wake material, in developing this product design the researcher must adjust starting from the selection of colors on the media, the materials used will be used until the form of an attractive design so that students feel learning is more memorable and the objectives of learning can be achieved, the development stage of the researcher designs material that is adapted to the Basic Competencies contained in the 2013 curriculum integrated thematic books. At this development stage the researcher conducts expert validation which will be assessed by a team of experts starting from design experts, material experts and learning implementing experts, the implementation stage of the researcher tested a small-scale product consisting of 6 students, after the small-scale trial was completed the researcher continued to test the product on a larger number, namely In one class of V-A students at SDN Kuningan Barat 01 South Jakarta, totaling 29 students, in the evaluation phase the researchers evaluated the effectiveness of using instructional media in class V-A SDN Kuningan Barat 01 South Jakarta.

Results and Discussion

The analysis stage that the researcher did first was to do a needs analysis for fifth grader in one of the state elementary schools at South Jakarta. The researcher conducted interviews with students and teachers. After conducting the interviews, the researchers conducted learning observations in class V-A in the learning process in the classroom. According to the results of the observations that the researchers made, the researchers encountered several problems that appears: 1) in the process of learning mathematics in flat shape material the teacher only used thematic books to explain the material, without the help of learning media, 2) students felt they did not understand the solid material flat including the formula for the area and circumference of the flat shape due to the lack of learning media that supports students to easily understand the material, 3) the learning outcomes of students in that class on flat shape material are very low. After conducting the interviews, the researchers conducted field observations to find out the extent of students' understanding of the mathematics subject matter of flat shapes. Seeing the problems that exist, the researcher provides a solution to develop media for teaching mathematics spin wheel flat shape material in that class.

The design stage that the researchers carried out in this study did a number of things to develop learning media products for the mathematics spin wheel for flat shape material. The steps in the design stage that the researchers carried out included the following: a) Learning media for the mathematics spin wheel, flat shape material refers to the basic competencies listed in the student book and teacher's book. b) The design of the mathematics rotary wheel learning media for flat wake materials is as follows: The design stage of the mathematics rotary wheel learning media design that researchers made using the Adobe application in making the design. The following is the design that the researchers made:

Figure 1. Math Spin

The development stage in this study, researchers obtained data by validating it through several validators, including:

Table 1. Expert Results

No	Aspect of Expertise	Results	Category
1	Material Expert	92%	Very Valid
2	Content Expert	90%	Very Valid
3	Lesson Implementation Plan Expert	90%	Very Valid

The implementation phase in this study the researchers conducted trials of learning media on a small and large scale, the results obtained in the trials of mathematics spin wheel learning media were as follows:

a. Small scale trials

The small-scale trial that the researchers conducted on 6 class of fifth grader students at state elementary school in south Jakarta was selected in the category of students who had the highest, medium and smallest flat material values. In this small-scale trial students were asked to work on the pretest and posttest questions that the researcher had made. The pretest value was taken before the researcher used the rotary wheel media while the posttest value was taken after the researcher used the learning wheel media in the classroom. From the existing pretest and posttest data, the researcher used the N-Gain formula to find out whether or not the use of rotary wheel learning media was effective in that class. Furthermore, the researchers conducted a large-scale trial to determine the level of validation and effectiveness of the mathematics rotary wheel learning media for fifth grader students.

b. Large scale trials

The large-scale trial that the researchers conducted on 29 class of fifth grader students was carried out with a learning process in class accompanied by the class teacher. In this large-scale trial, students were asked to work on the pretest and posttest questions that the researcher had made. The pretest value was taken before the researcher used the rotary wheel media while the posttest value was taken after the researcher used the learning wheel media in the classroom. From the existing pretest and posttest data, the researcher used the N-Gain formula to find out whether or not the use of rotary wheel learning media was effective in fifth grader. Data from the results of the N-Gain calculation according to (Ananda & Fadhli, 2018) if the final result obtained is greater than 0.7 then it is said to be highly effective, and the results from the N-Gain calculation that the researcher obtained scored 0.82 and are included in the category of high effectiveness (effective).

The evaluation stage in this study was carried out at the development stage where the learning media for the mathematics spin wheel material for flat shapes had been validated and had obtained results from the validator, the learning media validation that the researchers carried out included validation of design experts, validation of material experts and expert validation of learning implementation plans the results of each validator get very valid results for testing. The results of small- and large-scale trials got good results from the students, where there were no difficulties that the researchers found at this stage. The trials that were carried out also got good results, namely by obtaining a high effectiveness (effective) category and it can be said that the mathematics rotary wheel learning media flat shape material makes it easier for students to carry out the learning process in the classroom, student learning outcomes also increase by using wheel learning media turn math material flat shapes.

Conclusion

The development of the media for the mathematics spin wheel for flat shapes is made based on the needs and characteristics of elementary school students. The design of the mathematics spin wheel learning media that researchers made is very interesting because it develops innovations including 3D image shapes and a variety of color choices. The validity of the research and development of the mathematical rotary wheel media on flat shape material has been validated by several validators, including: a) Design experts score 92% with very valid criteria, b) Material experts score 90% with very valid criteria, c) The lesson plan expert gets a score of 90% with very valid criteria. These results, if averaged, get a value of 90% with very valid criteria. So, it can be concluded that the mathematical rotary wheel media for flat shapes is said to be valid or suitable for use in the learning process in the classroom. The level of effectiveness in the research and development of the mathematical rotary wheel media on flat shape material was tested on a small scale and on a large scale. In the small-scale trial stage, the researcher got an N-Gain score of 0.4 from the results of 6 students. Furthermore, in a large-scale trial, the researcher calculated the effectiveness by measuring the comparison of the pre-test and post-test and then calculated using the N- Gain formula and scored 0.82 and was included in the category of high effectiveness (effective).

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