

Development of Magic Disc Media for Flat Shapes in Fourth Grade Elementary School

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Article Info	ABSTRACT
<p>Keywords:</p> <p>Magic Disc Media, Flat Building</p>	<p>The type of development research with the Research and Development (R&D) method using the ADDIE model through 5 stages, namely Analysis, Design, Development, Implementation, and Evaluation. The number of students is 15 students. Based on an interview with the homeroom teacher of grade IV UPT SD NEGERI 135 GRESIK, the information obtained by the researcher regarding the problems in grade IV on the material of flat shapes is that in the process of learning Mathematics many have difficulty in understanding the material, one of which is that students have difficulty in the material of flat shapes, namely in understanding its characteristics. Based on the results of the study, the researcher produced a product in the form of magic disc media on the material of flat shapes. The results of the study from media validation obtained an average of 98% "very valid", material validation obtained 96% "very valid", student responses obtained an average of 95% "very good". Based on the results above, the product developed by this researcher is expected to make learning more enjoyable for students, as an additional media for educators, and for further researchers, it is hoped that they can further perfect the magic disc media to make it more interesting and in demand.</p>

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INTRODUCTION

To understand topics in Mathematics, students must possess mathematical abilities. One essential ability is understanding mathematical concepts, which is critical for solving real-life problems and addressing global challenges (Suraji et al., 2018). Mastering conceptual understanding in Mathematics is fundamental, as it supports deeper teaching and learning processes (Saputra, 2022). A student is said to have conceptual understanding skills if they meet predefined indicators (Unaenah & Sumantri, 2020).

The current education system in Indonesia adopts the 2013 Curriculum and the Independent Learning Curriculum (Merdeka Belajar). Therefore, education is very important for one generation to the next (Akrim, 2020; Hidayat, 2024; Simbolon, 2024; Sri 2024). The goal of these curricula is to improve human resources and enhance the quality of education in Indonesia,

encompassing all levels, from basic to higher education (Vhalery et al., 2022). Indonesia's education system has undergone multiple curriculum changes, transitioning from KTSP to K-13, and now to the Independent Curriculum (Rindayati et al., 2022). Despite these changes, the goal remains to improve the previous curriculum. These shifts reflect the efforts of authorities responsible for managing Indonesia's education system (Ardianti, 2022).

The expectation is that Indonesia's education system can map and measure students' abilities in Grades IV and VIII, particularly in Mathematics and Natural Sciences. Student performance in Mathematics in Indonesia can be assessed through TIMSS, PISA, and the National Examination (UN). According to TIMSS (Trends in International Mathematics and Science Study) 2015 results, Indonesia's average score was 397, ranking 44th out of 49 participating countries (Martin, 2017). The 2018 PISA (Programme for International Student Assessment) results showed Indonesia scoring 379, ranking 72nd out of 78 countries. Furthermore, the 2019 National Examination (UN) results revealed an average Mathematics score of 46.56, indicating low performance (Rahim et al., 2022).

Low learning outcomes suggest poor conceptual understanding among students. This is due to Mathematics being an abstract subject and the limited time available for teaching and learning (Rahmi et al., 2023). Conceptual understanding is crucial because mastering concepts helps students learn Mathematics more easily (Azizah et al., 2022). However, each student has different abilities in understanding mathematical concepts (Devi et al., 2022).

One way to address students' difficulties in understanding mathematical concepts is by using learning media. Learning media play a vital role in the teaching and learning process by capturing students' attention and preventing boredom during lessons (Wulandari et al., 2023). Therefore, the researcher was motivated to develop Magic Disc as a learning medium. Magic Disc is an educational tool in the shape of a circular disc that simplifies message delivery and understanding during the learning process.

Based on the above information and interview results, it is evident that using learning media can attract students' interest and motivate them during lessons. For instance, Magic Disc can be used as a learning medium. Referring to the problems mentioned earlier, learning media that encourage active participation and motivation during lessons are needed. High student interest in learning can positively impact conceptual understanding in Mathematics (Nurdiyana, 2022).

With this in mind, the researcher chose to develop Magic Disc Media for teaching flat shapes in Mathematics to enhance students' skills in recognizing flat shapes. This research is titled **"Development of Magic Disc Media for Flat Shapes in Fourth Grade Elementary School."**

RESEARCH METHOD

This study is a type of development research known as Research and Development (R&D). Conceptually, R&D involves a process of developing new products or refining existing products in a manner that can be justified. According to Sugiyono (2011), R&D methods aim to produce specific products and test their effectiveness. In this research, the development model used is ADDIE (Branch, 2009), which consists of the following stages: analysis, design, development, implementation and Evaluation.

RESULTS AND DISCUSSION

Analisis (Analysis)

This stage involves curriculum analysis, identifying students' needs, analyzing the material, and examining suitable learning media. Based on interviews with the homeroom teacher of Grade IV at UPT SDN 135 Gresik, the curriculum applied is the Independent Curriculum (IKM). This curriculum emphasizes interactive and project-based learning, providing students with ample opportunities to actively participate (Rahayu et al., 2022).

From the interviews, it was observed that students were enthusiastic about learning Mathematics but faced difficulties in understanding certain topics, such as identifying the characteristics of quadrilateral shapes. In accordance with the learning objectives outlined in the teaching module, students are expected to identify the types and features of quadrilateral shapes.

To make Mathematics enjoyable for students, appropriate learning media are needed to support the teaching-learning process. The researcher chose to develop Magic Disc media because of its simplicity. Magic Disc is a circular medium containing images of quadrilateral shapes along with their characteristics, which makes it easier for students to understand the topic. Students tend to be more engaged and active when learning is supported by suitable media.

Using learning media in teaching significantly enhances the effectiveness of learning and the delivery of material (Satria, 2019). Following this, the researcher analyzed the material required for media development. Learning objectives were also formulated to clarify what students should achieve after the learning process. Additionally, the selection of media was aimed at identifying what would best meet students' needs.

Design

The next stage was design, which is part of the ADDIE model. The Magic Disc media design involved determining materials and planning its structure. The design process was carried out using Canva, incorporating suggestions from academic advisors to improve the final design. Key steps included:

1. Initial design of the Media Magic Disc product

Choose a type and thickness of plywood that is not too thick and not too thin. Result in a circle that is not too big and not too small. Adjust the color of the media display so that it looks attractive. Selection of material After designing the initial product design, the next step is to prepare material that is in accordance with the problem and then presented on the Magic Disc learning media.

2. Selection of materials

The material used in Meldia Magic Disc is triplex.

3. Name selection




The media name on the banner has been designed to make the media look more attractive.

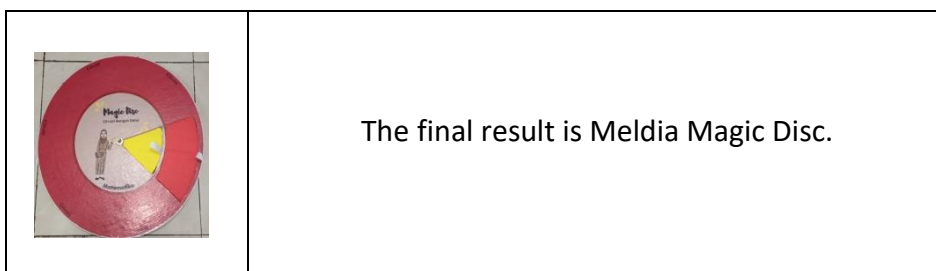
The design process involved cutting plywood into two circular pieces (40 cm in diameter), creating designs with images of quadrilaterals and their characteristics using Canva, and assembling these elements to form the Magic Disc.

Development

1. Media Creation

Tabel 1. Magic disc media development

Picture	Description
	Cutting the plywood into circles with a diameter of 40 cm.
	Attach the design to the plywood and ensure alignment.
	Creating a final product that included images of quadrilateral shapes and their characteristics.



2. Media Validation

a. Media expert validation results

After developing the media until it is finished, the next stage will be validated by 4 (four) validators which have been finalized since the beginning. Media validation is carried out based on the instrument that has been completed by the researcher. Based on the validation results from Meldia I experts, they achieved a score of 19 out of a maximum score of 20 and obtained a 95% high-performance cell test. Calculation results as a result:

$$P = \frac{f}{N} \times 100$$
$$= \frac{19}{20} \times 100 = 95\%$$

Meanwhile, the results of the Meldia II expert validation achieved a score of 20 out of a maximum score of 20, resulting in a 100% result. The calculation is:

$$P = \frac{f}{N} \times 100$$
$$= \frac{20}{20} \times 100 = 100\%$$

The average result of calculating the feasibility scores from the validator class is 98%, which means that the Magic Disc learning media has achieved very feasible criteria so that the media can be used in teaching and learning activities.

b. Validation of learning material experts

Validation of learning materials was carried out on January 26 2024 and the validators were Mrs. Delbby Dwi Sulsanti, S.Pd and Mrs. Yulni Sofiatulr Rohmah, S.Pd. Validation is carried out by completing the questionnaire and submitting comments in the column provided. Based on the results of the validation by material experts I achieved a score of 12 out of a maximum score of 12 and obtained a 100% cell performance. Calculation results as a result:

$$P = \frac{f}{N} \times 100 = \frac{12}{12} \times 100 = 100\%$$

Meanwhile, the validation results from material expert II achieved a score of 11 out of a maximum score of 12, resulting in a 92% result. Belrikult calculations as belrikult:

$$P = \frac{f}{N} \times 100 = \frac{11}{12} \times 100 = 92\%$$

The average result of calculating the feasibility score from the validator class is 96%, which can be interpreted as very feasible in terms of the material as well as the learning material so that the material can be used in the learning process.

Based on the validation results from two media expert validators and two material expert validators, the average value of the validator assessments is calculated by accumulating the results from each final validator and then added up, the results of the accumulated results are divided by the respective number of media and material validators. The results from the Meldia validator class obtained a Selbelsar mobile market value of 98% and a Selbelsar material validator expert score of 96%. So it can be concluded that the Magic Disc media being developed can be categorized as very worthy in terms of media and materials.

Implementation

1. Student responses

Media, which has been developed, validated and revised, will be practiced by 15 students in class IV UIPT SDN 135 Grelsik Gulna to know the response of students to Meldia Magic Disc. The results of student response questionnaires can be assessed by implementing the instructions that have been completed in the research. The results of the student response questionnaire are as follows:

Student recruitment agency recruitment:

$$\begin{aligned} &= \frac{(67 \times 4) + (38 \times 3) + (1 \times 2)}{(7 \times 4) \times 15} \times 100\% \\ &= \frac{268 + 114 + 2}{28 \times 15} \times 100\% \\ &= \frac{384}{420} \times 100\% = 91\% \end{aligned}$$

Based on the scores obtained, it is stated that the Magic Disc learning media is seen from the responses of 15 students who have achieved 91% of their learning and achieved very good criteria.

2. Teacher responses

The media that has been developed, validated and revised will be assessed by 2 teachers at UIPT SDN 135 Grelsik gulna to know the students' responses to the media magic disc. The results of the teacher response questionnaire can be assessed by using the instructions that have been

completed by the research. The results of the educational response questionnaire can be seen as follows:

Percentage of educators' response questionnaires

$$= \frac{(17 \times 4) + (1 \times 3)}{(4 \times 9) \times 2} \times 100\% = \frac{68 + 3}{72} \times 100\% = \frac{71}{72} \times 100\% = 99\%$$

Based on the scores obtained, it is stated that the learning media, seen from the responses of the educators, who were assessed by the 2 educators, had achieved a 99% student learning score and achieved very good criteria.

3. Pretest and posttest results

Students' pretest average score was 38, while the posttest average score was 55. The N-Gain score of 0.56066 falls under the "moderate" category.

Evaluation

Based on the results of the student and teacher response questionnaire, a fairly good figure was obtained.

Tabel 2. Recapitulation of questionnaire responses from students and educators

No	Aspect	Average percentage	Criteria
1	The questionnaire responds to students	91%	Very good
2	Educator response questionnaire	99%	Very good
Average		95%	Very good

Based on student and teacher responses, the Magic Disc media received an overall average score of 95%, categorized as "very good." The N-Gain score from pretest and posttest results further supports the media's effectiveness. The students' pre-test results have an average score of 38, meaning that students are still not very accurate in answering questions and are also still lacking in understanding the differences between pre-graduate and long-term students. Finally, the final results of the students' postgraduate studies were obtained with an average score of 55, meaning that the students had already started to answer the questions correctly and had already started to

be able to understand the characteristics of each quadruple flat shape. In this way, an N-Gain score of 0.56066 was obtained by category. Therefore, it can be concluded that the Magic Disc media can be declared effective and can be used and understood by students without taking notes of suggestions and input from validators.

CONCLUSION

This research was carried out at UPT SDN 135 Gresik with research subjects of 15 students. The research method uses the ADDIE development model which includes five stages: Analysis, Design, Development, Implementation and Evaluation. The research produced a product in the form of Magic Disc learning media made from plywood with a diameter of 40 cm. The validation results show that this media is very suitable for use, with a feasibility percentage of 98% from media experts and 96% from material experts, resulting in an average feasibility of 97%. The effectiveness of the Magic Disc is demonstrated through the pretest and posttest N-gain results of 0.56066 (medium category), as well as the results of the teacher and student response questionnaire of 95%, which meets the very good criteria. Based on these results, the Magic Disc learning media was declared very suitable and effective for use in learning.

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