
DEVELOPMENT OF POP-UP BOOK LEARNING MEDIA IN MATHEMATICS ON PLANE GEOMETRY MATERIAL FOR GRADE III STUDENTS AT SD NEGERI 064965 MEDAN

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ABSTRACT

This study aims to: (1) determine the product of Pop-Up Book learning media on plane geometry material, (2) determine the validity level of the media, and (3) determine the practicality level of the media. The method used in this study is Research and Development (R&D). The development model applied is the 4D model, which consists of four stages: (1) Define, (2) Design, (3) Development, and (4) Dissemination, introduced by Thiagarajan. This study produced a Pop-Up Book learning media for multiplication in elementary schools. Based on the validation results, the average scores were 91% from material experts, 93% from media experts, and 96% from language experts, indicating that the learning media meets the criteria of "very valid." The practicality results showed that the teacher response reached 92% and the student response reached 95%, indicating that the learning media meets the criteria of "very practical." Based on these results, it can be concluded that the Pop-Up Book learning media is highly valid/feasible and very practical for use in the learning process.

Keywords: Pop-Up Book Learning Media, 4D Learning Model, Students

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1. INTRODUCTION

The use of instructional media in educational institutions refers to the standards of facilities and infrastructure as regulated in Government Regulation Number 19 of 2005, Article 1 paragraphs (1) and (8), which emphasize that national education standards are the minimum criteria of the education system, including the utilization of facilities, infrastructure, and information and communication technology-based learning resources to support the learning process (Akbar, 2022). The presence of instructional media is an essential component in improving the quality of education through effective planning, implementation, and supervision of learning.

Along with the rapid development of technology and information, instructional media are expected to enhance the quality of teaching and learning processes as well as students' learning outcomes. However, in practice, the use of instructional media in elementary schools is still not optimal. Many available learning media are not utilized effectively, causing the learning process to be monotonous and less capable of increasing students' motivation and understanding. This condition may hinder the achievement of students' competencies, particularly in mathematics, which is often considered abstract.

Teachers are required to possess various professional competencies, one of which is the ability to use and develop instructional media (Himayaturohmah, 2019). Instructional media play a significant role in creating active, interactive, and meaningful learning experiences, enabling students to be directly involved in the learning process. However, in reality, many teachers still do not optimally utilize appropriate and engaging

learning media, especially in mathematics learning, resulting in students having difficulties in understanding abstract concepts (Ulfa & Nasryah, 2020).

The low use of instructional media is caused by limited access and a lack of teachers' understanding of educational technology. Teachers tend to rely on textbooks as the sole learning resource because they are considered practical, even though textbooks have limitations in presenting material and visualizing concepts. As a result, learning becomes less engaging and negatively affects students' motivation. In fact, the use of creative instructional media can reduce teacher dominance, increase student participation, and deepen understanding of the material (Atmaja, 2020).

Based on observations and interviews conducted at SD Negeri 064965 Medan on December 20, 2024, with a Grade III teacher, it was found that teachers are still limited in their use of instructional media and mainly rely on picture media and textbooks in mathematics learning, particularly on plane geometry material. Innovative instructional media such as Pop-Up Books have never been used in classroom learning. This condition affects students' low learning motivation and less optimal understanding of mathematical concepts.

One alternative instructional media that can be used to address this problem is the Pop-Up Book. A Pop-Up Book is an interactive book that combines two-dimensional and three-dimensional elements with visually engaging paper-folding techniques. This media can present mathematical concepts in a concrete and visual way, helping students understand plane geometry material more easily and enjoyably. In addition, the use of Pop-Up Books can assist teachers in delivering material more effectively and increasing students' learning motivation.

Based on these problems, this study aims to develop Pop-Up Book learning media in mathematics on plane geometry material for Grade III students at SD Negeri 064965 Medan. This development is expected to serve as an innovative learning solution, improve students' motivation, and help them understand plane geometry concepts more effectively. Therefore, this study is entitled: **"Development of Pop-Up Book Learning Media in Mathematics on Plane Geometry Material for Grade III Students at SD Negeri 064965 Medan."**

2. RESEARCH METHOD

This study employs the Research and Development (R&D) method, which aims to develop and test the feasibility of Pop-Up Book learning media in Mathematics on plane geometry material for Grade III elementary school students. This method was chosen because it focuses on developing effective learning products that align with students' needs.

The development design used is the 4D model, which includes the stages of Define, Design, Develop, and Disseminate. The Define stage is conducted to analyze learning needs and formulate learning objectives. The Design stage aims to plan the Pop-Up Book media, while the Develop stage includes product development, validation by media experts, material experts, and language experts, as well as limited trials with students. The Disseminate stage is carried out on a limited scale at the research site.

This study was conducted at SD Negeri 064965 Medan during the second semester of the 2024/2025 academic year. The research subjects included expert validators, a Grade III teacher, and 23 Grade III students. Data collection techniques used were interviews and questionnaires. The data were analyzed using a Likert scale to determine the validity and practicality levels of the developed learning media.

3. RESULTS AND DISCUSSION

This study is a Research and Development (R&D) study aimed at producing Pop-Up Book learning media on plane geometry material for Grade III students at SD Negeri 064965 Medan. The developed product has undergone validation by material experts, media experts, and language experts to assess content feasibility, visual appearance, and language use. The validation results show that the Pop-Up Book media obtained feasibility percentages of 91% for material aspects, 93% for media aspects, and 96% for language aspects, all categorized as “very valid.” Therefore, the media is considered feasible to use without revision and can proceed to limited trials.

A small group trial was conducted with six Grade III students to determine the practicality level of the media. The results showed that the Pop-Up Book media achieved a practicality percentage of 95%, categorized as “very practical.” Students’ responses indicated that the media is interesting, easy to use, and helpful in understanding plane geometry concepts. In addition, students appeared more active and enthusiastic during the learning process. The teacher’s response also indicated a very high level of practicality with a percentage of 92%, suggesting that the media is easy to implement in classroom learning without requiring additional adjustments.

The developed Pop-Up Book media has advantages in its attractive visual design, use of bright colors, and three-dimensional pop-up images that enhance students’ attention and learning interest. The material is presented systematically using simple and communicative language, making it suitable for the characteristics and cognitive development of elementary school students. This media also helps students understand plane geometry concepts concretely, which were previously delivered abstractly through textbooks.

The development of this media follows the 4D model, including the Define, Design, and Develop stages, while the Disseminate stage is conducted on a limited scale due to time and resource constraints. In the Define stage, a needs analysis was carried out through observation and interviews with teachers, revealing that learning was still dominated by conventional media and lacked innovative approaches. The Design stage focused on organizing the material and creating an engaging Pop-Up Book design aligned with the curriculum. The Develop stage included expert validation and limited trials to ensure the media’s feasibility and practicality.

Based on the validation and practicality test results, it can be concluded that the developed Pop-Up Book learning media meets the criteria of being valid and very practical. This media is not only feasible as an alternative Mathematics learning tool but also capable of increasing students’ activeness, motivation, and understanding of plane geometry material. Therefore, the Pop-Up Book can serve as an innovative solution to support Mathematics learning in elementary schools.

4. CONCLUSION

Based on the results of the development research conducted, it can be concluded that the Pop-Up Book learning media on plane geometry material was successfully developed using the 4D model, which includes the Define, Design, and Develop stages, while the Disseminate stage was not widely implemented due to limitations in time, cost, and resources. The developed media was designed in accordance with the needs of Mathematics learning in Grade III elementary school and oriented toward students’ characteristics.

The validation results from experts indicate that the Pop-Up Book learning media falls into the “very valid” category, with assessment percentages of 93% from media

design experts, 91% from material experts, and 96% from language experts. This shows that the Pop-Up Book media meets the criteria for content feasibility, visual design, and language use, making it suitable for use in the learning process.

In addition, the practicality test results show that the Pop-Up Book media received very positive responses from both teachers and students. The teacher's response indicated a practicality level of 92%, while students' responses reached 95%, both categorized as "very practical." Therefore, the Pop-Up Book learning media is considered feasible and practical to be used as a Mathematics learning tool on plane geometry material to enhance students' activeness and understanding in the learning process.

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