

Development of Spinning Wheel Learning Media on Plane Figures to Improve the Mathematics Learning Outcomes of Second-Grade Elementary School Students

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Article	Abstract
<p>Keywords: Plane Figures; Spinning Wheel Media; Mathematics Learning Outcomes; Development; Second-Grade Elementary School Students.</p> <p>Article History Received: Nov 12, 2025 Reviewed: Des 11, 2025 Accepted: Jan 11, 2026 Published: Feb 03, 2026</p>	<p><i>This study uses a Research and Development (R&D) approach with the ADDIE model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. The analysis stage involves identifying learning needs, student characteristics, and problems encountered in mathematics learning, particularly on the topic of plane figures. The design stage focuses on planning the spinning wheel learning media, including the preparation of materials, questions, visual appearance, and media usage procedures. The development stage includes the creation of the media, product revision, and improvement based on development results. The implementation stage conceptually involves the use of the media in learning activities by engaging students actively through educational games. Finally, the evaluation stage includes theoretical assessment based on literature studies and previous research regarding the feasibility and effectiveness of the developed media. The results of the study indicate that the spinning wheel learning media on plane figures has the potential to improve students' mathematics learning outcomes by creating a more active, interactive, and enjoyable learning atmosphere. The media helps students understand the concepts of plane figures more concretely through direct learning experiences. In addition, the use of the spinning wheel media can increase student engagement, learning motivation, and participation during the learning process. This study contributes to the development of innovative mathematics learning media that are appropriate to the characteristics of elementary school students and supports the implementation of meaningful learning.</i></p>



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INTRODUCTION

Education is a conscious and planned effort to create learning conditions and learning processes that enable students to actively develop their potential. In

elementary schools, learning should be designed to provide meaningful learning experiences in accordance with students' developmental characteristics. One subject that plays an important role in developing students' thinking skills is mathematics. Mathematics learning in elementary schools aims not only to help students master concepts but also to train logical, systematic, critical, and creative thinking skills.

However, mathematics learning in elementary schools still faces various challenges. One of the frequently encountered problems is the low learning outcomes of students in mathematics subjects. Students often experience difficulties in understanding abstract mathematical concepts, especially on the topic of plane figures. Many students are unable to distinguish the characteristics of various plane figures, identify their properties, and apply these concepts in problem-solving situations. This condition affects students' learning outcomes and their motivation to participate in mathematics learning.

The low learning outcomes are influenced by several factors, one of which is the limited use of innovative learning media. In many schools, the learning process is still dominated by lecture methods and the use of textbooks as the primary learning resources. This causes students to become passive learners and makes it difficult for them to understand mathematical concepts concretely. As a result, students tend to memorize information without fully understanding the concepts being taught.

Research conducted by Moto (2019) states that the use of learning media has a significant influence on the effectiveness of the learning process because media can help convey information more clearly and attract students' attention. Likewise, Arsyad (2019) explains that learning media function as tools that can improve students' understanding and learning outcomes through more concrete learning experiences.

To address these issues, teachers need to utilize learning media that are capable of creating active, engaging, and enjoyable learning experiences. One learning medium that can be used is the spinning wheel learning media. The spinning wheel is an educational game-based learning medium designed in the form of a wheel that can be rotated and contains various questions or learning materials. This medium allows students to learn while playing, thereby creating a more enjoyable learning atmosphere.

The spinning wheel learning media has several advantages. In addition to being attractive in terms of appearance, this medium is also able to increase student participation in the learning process. Through spinning wheel activities, students are encouraged to actively answer questions, discuss with their peers, and interact directly with the learning materials. Such learning activities are expected to help

students understand mathematical concepts more easily and improve their learning outcomes.

According to Fadhilah, Mustaji, and Jannah (2021), the use of spinning wheel media can improve children's learning abilities because it provides direct learning experiences and stimulates active student involvement. Similarly, Tia, El Puang, and Bunga (2023) found that spinning wheel media positively affects elementary school students' mathematics learning outcomes because it creates a more interactive and enjoyable learning environment.

The topic of plane figures is one of the mathematics topics taught in the lower grades of elementary school. This material introduces students to various two-dimensional shapes such as squares, rectangles, triangles, and circles, along with their characteristics. A proper understanding of plane figures is essential because it serves as the foundation for learning geometry at higher educational levels. However, many students still experience difficulties in distinguishing the characteristics and properties of each plane figure due to the abstract nature of the concepts being taught.

Learning media that are visual and interactive can help students understand the concepts of plane figures more concretely. The spinning wheel learning media allows students to directly observe images of plane figures, identify their characteristics, and answer questions related to the material. Through these activities, students are expected to gain more meaningful learning experiences and better understand the concepts being studied.

Several previous studies have shown that the use of innovative learning media can improve students' learning outcomes. Fitri, Rifai, and Tati (2024) reported that the application of the Plane Figure Wheel Media (Robadar) was able to increase elementary school students' motivation to learn mathematics. In addition, Faluvi, Arbaini, and Putri (2023) found that spinning wheel media significantly improved students' mathematics learning outcomes compared to conventional learning methods.

Despite these findings, the use of spinning wheel learning media on the topic of plane figures is still relatively limited, particularly in lower elementary grades. Therefore, there is a need for the development of learning media that are appropriate to students' characteristics and learning needs. Through the development of plane figure spinning wheel media, students are expected to become more active, motivated, and capable of understanding mathematical concepts more effectively. Based on the description above, this study aims to develop a plane figure spinning wheel learning media that is suitable for use in mathematics learning for second-grade elementary school students. This study is expected to contribute to the

development of innovative learning media and serve as an alternative solution for improving students' mathematics learning outcomes in elementary schools.

METHOD

This study employed the **Research and Development (R&D)** method, which aims to develop a product in the form of a spinning wheel learning media on plane figures for second-grade elementary school students. The R&D method is a type of research that aims to create a specific product and evaluate its feasibility and effectiveness within a learning context. According to Sugiyono (2014), research and development is a research method intended to determine the extent to which a product possesses quality and relevance in accordance with its development objectives. Furthermore, Gall et al. stated that the primary purpose of research and development is to produce a product while simultaneously testing its effectiveness. In addition, Fayrus and Slamet (2022) explained that development research in the field of education is a systematic process used to develop and validate educational products.

In developing this learning media, the researcher employed the **ADDIE model**, which consists of five main stages: **Analysis, Design, Development, Implementation, and Evaluation**. The ADDIE model was selected because it has systematic, simple, and easily applicable procedures for developing learning media. Barokati and Annas (2013) stated that the ADDIE model is one of the models that can serve as a guideline for developing effective, dynamic learning that supports the learning process. In line with this, Robert Maribe Branch explained that the ADDIE model is a systematic and effective approach to developing instructional products that meet learners' needs. Each stage of the ADDIE model is interconnected and continuous, allowing the media development process to be carried out in a directed manner and resulting in products that are valid, practical, and effective for use in learning.

In addition, the selection of the ADDIE model is supported by the instructional design theory of Walter Dick and Lou Carey, which emphasizes the importance of a systematic process in designing effective learning. This theory explains that instructional development should go through stages of needs analysis, design, development, and evaluation in order to produce products that align with learning objectives. Furthermore, according to Benny A. Pribadi, a systematic instructional design model will assist developers in producing high-quality learning media that are suitable for learners' characteristics. In addition, Seels and Glasgow also emphasized that the evaluation process in media development is very important to ensure the quality and usefulness of the resulting product.

Second-grade elementary school students are still in the **concrete operational stage**, therefore they require learning media that are visual, attractive, and allow direct involvement in the learning process. Accordingly, the researcher designed a **plane figure spinning wheel media** as a solution to improve the quality of mathematics learning for students. This media was designed by considering student characteristics and learning needs that emphasize activity and direct experience. The preparation of the instrument was carried out to obtain reliable data regarding the feasibility of the developed media. During the development process, the researcher also made several improvements to the media's appearance, such as clarifying the text, improving the visual design, and adjusting the difficulty level of the questions to make them easier for students to understand before the media was used in the implementation stage.

The development of the spinning wheel learning media in this study employed the **ADDIE model**, which consists of five stages: **Analysis, Design, Development, Implementation, and Evaluation**. This model was chosen because it provides systematic and structured procedures for developing an instructional product that is effective and suitable for learners' needs. According to Robert Maribe Branch, the ADDIE model is a systematic approach to instructional design that enables developers to produce high-quality products through interconnected and continuous stages.



Figure 1. ADDIE Model Development Flow

The first stage was **analysis**, which aimed to identify learning problems and student needs. At this stage, observations and literature studies were conducted regarding mathematics learning conditions in elementary schools, particularly on plane figure material. The results of the analysis indicated that students still experienced difficulties in understanding the concepts of plane figures because learning tended to be teacher-centered and lacked the support of interactive learning media. Students also showed low motivation and participation in learning activities. Therefore, it was necessary to develop a learning medium capable of creating a more engaging, enjoyable, and meaningful learning experience.

The second stage was **design**, which involved planning and designing the learning media to be developed. At this stage, the researcher designed the shape, components, appearance, and content of the plane figure spinning wheel media. The media was designed in the form of a rotating wheel divided into several sections containing pictures of plane figures and questions related to the material. In addition, the researcher prepared the learning materials, rules for using the media, and learning activities that would be implemented through the spinning wheel. The design was adjusted to the characteristics of elementary school students by using attractive colors, clear images, and simple language.

The third stage was **development**, which involved producing the learning media according to the previously prepared design. The spinning wheel media was created using materials that are easy to obtain and safe for use by elementary school students. After the media was developed, revisions and improvements were made to both the appearance and content to ensure that the media was appropriate for learning use. This stage also included reviewing various references and previous studies related to the use of spinning wheel media in mathematics learning.

The fourth stage was **implementation**, which is the stage of using the media in learning activities. However, in this study, the implementation stage was not conducted directly in the field because the research used a literature review approach. Nevertheless, conceptually, the spinning wheel media can be used in learning activities by actively involving students through spinning the wheel, answering questions, and interacting within groups, thereby creating a fun and interactive learning atmosphere.

The final stage was **evaluation**, which aimed to assess the quality and feasibility of the developed learning media. In this study, evaluation was conducted theoretically through a review of literature and previous studies. The evaluation included assessing the attractiveness of the media, its suitability to student characteristics, and its potential to support students' understanding of plane figure concepts.

Through this evaluation stage, the strengths and weaknesses of the media could be identified and used as a basis for further improvement and development. The purpose of the evaluation stage was to identify the advantages and limitations of the developed media and to determine how effective the media would be in improving mathematics learning outcomes among students. If any deficiencies were found in the media, revisions and improvements would be made to ensure that the product better meets the learning needs of elementary school students. Through this evaluation process, the plane figure spinning wheel media is expected to function as a valid, practical, and effective learning tool capable of creating a more active, enjoyable, and meaningful mathematics learning environment for students.

RESULTS AND DISCUSSION

This study produced a learning media product in the form of a plane figure spinning wheel designed to improve the mathematics learning outcomes of second-grade students at SD Negeri Tidung. The media was developed using the ADDIE model, which consists of five stages: analysis, design, development, implementation, and evaluation, all carried out systematically based on the problems identified in the learning process.

The results of the initial observations indicated that students still experienced difficulties in recognizing the shapes and characteristics of plane figures, while classroom learning was still dominated by lecture methods and textbook use, resulting in limited active student involvement. These conditions caused students to become bored quickly, lose focus, and show low learning motivation. Therefore, an innovative learning medium was needed to help students understand concepts more concretely and enjoyably.

As a solution, the researcher designed a plane figure spinning wheel learning media as an engaging and interactive learning tool to encourage students to become more active and to facilitate a better understanding of the material being taught. It was expected that this medium would increase both student engagement and learning outcomes in mathematics learning.

During the analysis phase, the researcher conducted observations and interviews with second-grade teachers at SD Negeri Tidung to understand the existing mathematics learning conditions in the classroom. The observations revealed that the learning process was still dominated by conventional methods, where lectures served as the primary strategy for delivering instructional content.

Teachers tended to provide explanations directly without utilizing varied learning media. This condition caused students to act primarily as passive listeners and limited their active participation in learning activities. In addition, during the learning process, several students appeared less focused, were easily distracted, and showed signs of boredom.

The interview results also indicated that students experienced difficulties in understanding plane figure concepts, particularly in recognizing shapes and distinguishing the characteristics of each plane figure. The teacher explained that students could understand the material more easily when learning involved attractive media and activities that allowed direct student participation. However, the use of interactive learning media in the classroom was still very limited, resulting in students receiving fewer enjoyable learning experiences. Based on these conditions, the researcher concluded that a learning medium was needed that could increase student engagement while simultaneously helping students understand concepts more concretely.

During the **design phase**, the researcher began designing the spinning wheel media as a solution to the identified problems. The media was designed in the form of a rotating circle divided into several sections containing materials and questions related to plane figures. Each section of the wheel contained images of plane figures such as squares, rectangles, triangles, and circles, accompanied by questions or instructions that students were required to answer. The media design utilized bright colors, attractive images, and clear text to match the characteristics of elementary school students. In addition, the researcher also designed simple instructions for using the media to ensure that students could easily understand how to use it.

During the **development phase**, the spinning wheel media was physically produced using easily obtainable materials such as cardboard or board. The media consisted of several main components, namely a spinning wheel board, a pointer, question cards, and usage instructions. The questions were designed according to the learning indicators and the ability level of second-grade elementary school students. During the development process, the researcher also revised the media by improving text clarity, enhancing visual appearance, and adjusting the level of difficulty of the questions so that they would be easier for students to understand. The development results showed that the spinning wheel media possessed characteristics that were simple, attractive, and easy to use in learning activities.

Visually, the resulting **plane figure spinning wheel media** featured an attractive appearance with a combination of bright colors and clear illustrations of plane figures. The media was designed to create a fun learning atmosphere through play-based learning activities. The method of using the media involved students taking turns spinning the wheel and then answering questions according to the section indicated by the pointer. These activities could be conducted individually or in groups, thereby increasing interaction, cooperation, and students' confidence in expressing their opinions. The developed spinning wheel media can be seen in the following figure:



Figure 2. Plane Figure Spinning Wheel Media

During the **implementation phase**, although it was not conducted directly in the field because the study was based on a literature review approach, the use of the spinning wheel media can conceptually be applied in classroom learning. Teachers can integrate this media into learning activities by dividing students into groups and then providing each student with the opportunity to spin the wheel and answer the questions that appear. This activity can create an interactive and enjoyable learning atmosphere while encouraging students to become more active in the learning process.

During the **evaluation phase**, the learning media was analyzed theoretically based on literature reviews and previous studies. The evaluation results showed that game-based learning media such as the spinning wheel have the potential to increase student engagement and help students understand concepts more concretely. The media was also considered suitable for the characteristics of elementary school students, who generally prefer interactive and enjoyable learning activities. In addition, the spinning wheel media possesses advantages in terms of ease of use, visual attractiveness, and suitability for the learning material.

Overall, the research results indicate that the developed **plane figure spinning wheel media** has strong potential to be used as a mathematics learning medium in elementary schools. This media not only helps students understand plane figure concepts but is also capable of increasing student engagement in the learning process. Therefore, the spinning wheel media can serve as an alternative solution for creating more innovative, interactive, and effective learning experiences.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that the development of the plane figure spinning wheel learning media has the potential to improve the mathematics learning outcomes of second-grade elementary school students. The media was developed using the **ADDIE model**, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. Through these stages, a learning medium was produced that is attractive, interactive, and aligned with the characteristics of elementary school students.

The results of the analysis indicate that one of the factors causing the low mathematics learning outcomes of students is the limited use of innovative learning media. Learning tends to be teacher-centered, causing students to become less active and to experience difficulties in understanding abstract concepts such as plane figures. Therefore, the development of a learning medium that can create a more concrete and enjoyable learning experience is necessary.

The developed spinning wheel media is capable of presenting learning materials in a more engaging way through game-based activities. The use of this media allows students to learn while playing, actively participate in learning activities, and gain direct learning experiences. This condition can increase students' motivation, attention, and enthusiasm for learning mathematics.

Based on theoretical evaluations and reviews of previous studies, the plane figure spinning wheel media has several advantages, including increasing student participation, facilitating concept understanding, creating an enjoyable learning atmosphere, and supporting collaborative learning activities. In addition, the media

is also suitable for the cognitive characteristics of elementary school students who are in the concrete operational stage and require concrete learning experiences to understand concepts effectively.

Thus, the plane figure spinning wheel learning media can be used as an innovative alternative learning medium in elementary school mathematics learning. The use of this media is expected to create a more active, interactive, and meaningful learning process, ultimately contributing to the improvement of students' mathematics learning outcomes.

SUGGESTIONS

Based on the conclusions of this study, several suggestions can be proposed:

1. For Teachers

Teachers are expected to utilize innovative learning media, such as the plane figure spinning wheel, in mathematics learning activities. The use of engaging and interactive media can help students understand concepts more easily and increase their motivation to learn.

2. For Schools

Schools are expected to support teachers in developing and utilizing learning media by providing adequate facilities and infrastructure. Such support is important to create a learning environment that is more innovative and conducive.

3. For Future Researchers

Future researchers are encouraged to conduct field trials of the developed spinning wheel media to obtain empirical data regarding its effectiveness in improving students' mathematics learning outcomes. In addition, similar media can be developed for other learning topics and subjects.

4. For Students

Students are expected to participate actively in learning activities and take advantage of learning media as a means of understanding concepts more effectively. Active involvement in learning can help improve learning outcomes and learning experiences.

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