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Skills For Composition and Decomposition of Flat Shape of Class III Students Using Geostick Media in the Pmri Approach

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Abstract
This study aims to capture students' skills in composing and decomposing plane figures using geostick media within the framework of the Indonesian Realistic Mathematics Education (PMRI) approach. Geosticks were chosen as a teaching aid due to their ability to concretely visualize geometric shapes, making it easier for students to understand abstract concepts. This research employs a descriptive qualitative method involving direct observation of students' skills in assembling and disassembling plane figures. The findings reveal that geostick media can enhance third-grade students' skills in composing and decomposing plane figures. However, some students encountered difficulties in forming more complex shapes, which required additional guidance from the teacher. Overall, this study indicates that contextual learning media, such as geosticks within the PMRI approach, can improve third-grade students' skills in composing and decomposing plane figures.

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1. INTRODUCTION

Education can be obtained from anywhere, both formal and non-formal. One of the main lessons in formal education is Mathematics learning (Pratiwi & Wiarta, 2021). Mathematics is a subject that exists at all levels of education, from elementary school to university level. Studying mathematics, especially in the Flat Figure material, Composition and Decomposition of Flat Figures sub-material, can provide insight into students' abilities in solving problems, which in turn can support the development of critical and analytical thinking skills. However, the level of learning difficulty varies depending on the level of education (Zahra Raynanda, 2024).

In essence, education in elementary schools aims to provide important skills and abilities to face a future that will be increasingly difficult (Mubharokh et al., 2022). The role of education is very important in helping to realize and grow awareness of sustainability and must be instilled from an early age. Therefore, it requires attention and handling by the government, community and family (Widyasarit al., 2024). Education is related to technological developments that are interrelated, creating dynamics that influence the way we learn, teach and acquire knowledge. Learning media is absolutely necessary in the world of education because media plays a very important role in the learning process. Learning media can help disseminate information, thereby increasing students' thoughts, feelings, attention and interest.

The ability to think mathematically is one of the main competencies that students must master in the mathematics learning process. Various studies show that many students still have difficulty developing students' mathematical thinking abilities (Sapitri et al.,

2022). One of the factors causing students' low mathematical thinking abilities is the conventional learning approach, where teachers tend to use lecture methods and practice questions which do not involve students actively in the learning process (Nofita et al., 2022). As an alternative, the Project-Based Learning (PjBL) learning model has been identified as an effective approach to improving students' mathematical thinking abilities (Suharyati & Arga, 2023). PjBL is a learning model that focuses on exploring real and relevant problems, where students are actively involved in the process of finding solutions through in-depth and structured projects. Through PJBL, students are expected to be able to develop critical, analytical and creative thinking skills, and be able to apply mathematical concepts in various real-life contexts (Widyasari et al., 2024).

One learning approach that can help teachers in teaching mathematics is that teachers must be able to convey material not only in conceptual form, but also relevant to real contexts. The aim is to make the mathematics learning process more interesting, so that students can more easily understand mathematical concepts in more depth and students can apply learning concepts in everyday life. One approach that teachers can use when teaching mathematics is the Indonesian Realistic Mathematics Education Approach (PMRI) (Akhidah et al., 2023).

Geosticks can be used as a learning tool in an educational environment because they can be adapted to the material to be delivered. Geostick acts as a transmitter of learning messages through the media to form flat shapes by forming flat shapes on books. Sticks are easy to use because we will utilize the shape and natural properties of sticks as a thematic learning medium. The sticks can be arranged into flat shapes such as squares, rectangles, triangles, rhombuses, parallelograms, kites and trapezoids because the sticks are easy to cut and arrange. In previous research conducted by Zahra Raynanda, et al (Zahra Raynanda, 2024) entitled "Development of Doratoon-Based Animation Video Media on Class IV Composition and Decomposition Material at SD IT Darussalam Deli Tua" obtained satisfactory results by achieving the objectives of use. This media is a successful learning trajectory.

This Study intended to analyze composition and decomposition of flat shapes for class III students using Geostick media in the PMRI approach. The introduction should contain (in order) general background, previous literature review (*state of the art*) as the basis for statements of scientific novelty from articles, statements of scientific novelty, and research problems or hypotheses.

At the end of the introduction, the purpose of the article study must be written. In the scientific article format, literature reviews are not permitted as in research reports, but are carried out in the form of previous literature reviews (*state of the art*) to demonstrate the scientific novelty of the article.

2. RESEARCH METHOD

This research was conducted on Saturday, October 26 2024 at SD Negeri 2 Megawon class III for the 2024/2025 academic year. This research uses a descriptive qualitative method in which we study in depth the students' activities when compiling and describing flat shapes using Geostick media. Descriptive qualitative research was carried out to explain existing research without manipulating the data on the variables studied by conducting direct interviews (Hanyfah et al., 2022).

Researchers used descriptive qualitative methods because researchers considered this problem to be quite complex from the data obtained from our sources (Class III female students). Qualitative research methods emphasize the skills aspect in depth regarding a problem or problem rather than looking at the problem to generalize. This can be seen from several types of research used in qualitative research.

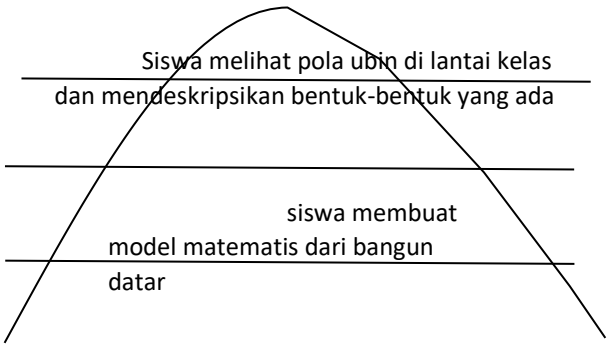
3. RESEARCH RESULTS AND DISCUSSION

This research was conducted at SD Negeri 2 Megawon on class III students with the main aim of photographing students' skills in composing and decomposing flat shapes using geostick media in the Indonesian Realistic Mathematics Education (PMRI) approach. From interviews, students admitted that they enjoyed learning with geosticks more than conventional methods, although they needed further assistance to understand decomposition. Teachers also appreciate this media because it makes it easier for students to understand the relationships between flat shapes, while group work has been proven to help students who experience difficulties.

Through a descriptive qualitative approach, researchers observed the skills of compiling and describing involving flat shapes. Geosticks, namely learning tools in the form of sticks that can be arranged into various flat shapes, were chosen as media because of their flexible nature and ability to help students visualize concepts.

Iceberg Model Integration

The iceberg model is used to illustrate how students' organizing and describing skills are often only visible on the surface in the form of observed behavior, while the deep concepts on which their skills are based are hidden beneath the surface. In the context of learning mathematics using geosticks, the top of the iceberg represents students' enthusiasm and ability to form simple flat shapes, while the bottom reflects in-depth skills regarding the concepts of composition and decomposition, critical thinking, and collaboration that support in-depth learning.



Picture 1 Iceberg

a. Mathematics

(1) Ice Berg

Students are given contextual problems taken from the surrounding environment, such as observing the shape of a window (rectangle) or the roof of a house (triangle). Students actively arrange and decompose flat shapes using geostick media. They are encouraged to discover relationships between sides and angles through exploration. The interaction between students and teachers is focused on discussions about how to arrange and decompose flat shapes. The teacher provides feedback in the form of open-ended questions, such as, "How did you find the length of this side?"

Figure 2 Students arrange flat shapes based on observations

(2) Deep Process

This process involves translating real situations into mathematical form. Students not only understand flat shapes abstractly but also relate them to everyday experiences. For example, students observing tile patterns in class begin to understand the relationship between side length and square area.

Figure 3 Students understand flat shapes abstractly

b. Didactic Phenomenon

(1) Ice Berg

Students succeed in constructing new shapes, such as a square from two triangles, or breaking down complex shapes such as a parallelogram into simpler shapes.

Figure 4 Students arrange flat shapes

(2) Deep Process

Students are faced with the challenge of arranging flat shapes in various ways. This phenomenon triggers creative exploration and problem-solving skills, such as making a house model from a combination of flat shapes.

Figure 5 Students arrange flat shapes into one unit

c. Use of Models

(1) Ice Berg

Students use geosticks to create flat shapes such as quadrilaterals and triangles, then describe their properties.

Figure 6 Students arrange various flat shapes

(2) Deep Process

The use of teaching aids such as geosticks provides direct experience for students to understand the geometric properties of flat shapes, such as the relationship between sides, angles and area.

Figure 7: Students understand the geometric properties of flat shapes

d. Guided Discovery

(1) Ice Berg

Students discover new formulas or creative ways to arrange flat shapes through

independent exploration and class discussions.

Figure 8 Students construct flat shapes through discussion and independent exploration

(2) Deep Process

Teachers guide students through steps such as problem orientation, independent exploration, class discussion, reflection, and feedback. For example, students understand the formula for the area of a triangle through exploring shapes using a geostick.

Figure 9 Teacher provides feedback to students

Discussion

This research highlights how the Indonesian Realistic Mathematics Education (PMRI) approach applied with the help of geostick media can improve students' skills in the concepts of composition and decomposition of flat shapes. Purnaningtyas (Purnaningtyas & Safa'atullah, 2023) stated that PMRI is a learning approach that emphasizes the relevance and connection between mathematical concepts and real situations, so that students can interpret and apply mathematics in everyday life. In this case, geosticks are an important medium because they help students visualize and form concrete shapes, making mathematical concepts easier to understand and interesting for students.

Geostick media, which consists of sticks that can be cut and arranged into various shapes, offers flexibility in learning basic geometry. This tool allows students to arrange various flat shapes such as squares, triangles, parallelograms and trapezoids. Students can immediately observe how the parts of the shape are interconnected and construct new shapes from these parts. This activity helps students understand the concepts of composition (building a shape from small parts) and decomposition (breaking down a shape into simpler parts) in a concrete way.

During the research, it was seen that the use of geosticks not only facilitated students' skills regarding geometric shapes, but also improved students' critical thinking skills. In the process of compiling and breaking down flat figures,

Students are required to think analytically and solve the problems they face. Students must consider the shape, size and orientation of the stick to form the required shape. This activity encourages students to engage in deep thinking, which in turn develops students' problem-

solving skills.

In terms of involvement and enthusiasm, geostick succeeded in attracting students' attention and increasing students' active participation in learning. Compared to the lecture method which is often felt to be boring, this media approach provides a more interactive learning experience. Students are more interested in being directly involved, trying to arrange various shapes, and exploring different ways to achieve the desired results. This shows that geostick media plays a big role in creating a fun learning atmosphere and motivating students.

Although the majority of students succeeded in following the lesson well, there were some who experienced difficulty in constructing more complex flat shapes, such as kites or parallelograms. According to Yudiani (Yudiani, 2022) this difficulty could be caused by students' limited geometry skills or the need for more time and assistance from the teacher. However, with proper guidance, students who experience difficulties are eventually able to master the material, even though it takes longer.

The PMRI approach also allows teachers to more easily relate abstract concepts to reality. In this case, students learn that flat shapes are not just theories in books, but something that students can see, touch and arrange themselves (Bellinda et al., 2023). This process strengthens students' skills regarding mathematical concepts and helps students see direct connections between geometric concepts and real life, such as shapes that students often encounter in the surrounding environment (Romadon et al., 2023).

The use of geosticks in the PMRI approach provides variations in mathematics learning methods, which are generally considered challenging and sometimes boring by many students (Kumullah & Yulianto, 2020). Through this learning, students not only sit passively listening to the teacher's explanation, but also actively do, think and feel for themselves. This activity gives students the opportunity to feel success and satisfaction when students succeed in forming the correct shape, which of course increases students' learning motivation (Cahirati et al., 2020).

The research results show that learning media such as geosticks can be an effective means of teaching basic mathematical concepts in an interactive and interesting way. This is an alternative for teachers who often only rely on lecture methods and practice questions in teaching mathematics. With this media, teachers can adapt the learning process to the needs and abilities of students, providing a more personal and appropriate approach (Yuliyanti et al., 2021).

The findings of this research also indicate the importance of the teacher's role in providing direction and guidance when using learning media. Use
Geosticks require clear explanations so that students understand how to use them correctly (Rosadi et al., 2022). According to Harianda (Harianda & Junedi, 2021), teachers play an important role in accompanying students, especially for students who need more help in understanding and mastering the concepts being taught.

This is relevant to the opinion of Realistic Mathematics Education (RME) which emphasizes that mathematics learning should be centered on real context and experience, so that students can more easily understand and apply mathematical concepts in everyday life (Zenal Mutaqin & Vkar, 2021).

In line with Diva's opinion (Aura Diva et al., 2022) which states that the mathematics learning process will be more meaningful if students can explore concepts directly and actively through structured and contextual situations, geosticks are an alternative that supports student involvement in learning. This opinion is also in line with Purba (Purba et al., 2022) who suggests that learning will be more effective if it is adapted to individual needs and abilities, and involves active student interaction in constructing skills.

4. CONCLUSION

This research shows that geostick media in the context of Indonesian Realistic Mathematics Education (PMRI) can improve class III students' skills in the concept of composition and decomposition of flat shapes. Geostick assists students in the visualization of geometric shapes, facilitating the development of critical thinking skills, problem solving, and active engagement in process learning. With the PMRI approach, mathematics learning becomes more interactive and relevant for students, thereby increasing their motivation and interest in mathematics.

In conclusion, students' skills in composing and decomposing flat shapes using geostick media in the Indonesian Realistic Mathematics Education (PMRI) approach are an effective alternative to overcome the limitations of conventional learning methods.

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