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Utilization of Stick Media in Improving Critical Thinking Skills in Spatial Building Material in Grade 4 Elementary School

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Abstract

This study aims to explore the use of stick media in improving critical thinking skills in fourth-grade students on the topic of properties of space figures. The research employs a qualitative case study approach, focusing on how stick media can facilitate students' understanding of geometric concepts and enhance their ability to analyze and evaluate spatial relationships. Data were collected through observations, interviews with teachers and students, and tests measuring critical thinking skills before and after the intervention. The results show that the use of stick media significantly increased students' ability to critically analyze and solve problems related to space figures. This study concludes that stick media is an effective and engaging tool for improving critical thinking skills, especially in mathematics, and provides a concrete learning experience for students to better understand abstract concepts.

Keywords– *Stick media, Mathematics Education, Critical Thinking, Elementary School*

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1. Introduction

Elementary education plays a vital role in building the foundation of students' knowledge and skills. One of the most important skills to develop at the elementary school level is critical thinking skills. According to Ennis (2011), critical thinking involves the ability to analyze, evaluate, and construct arguments in a logical and rational manner. In the context of mathematics learning, this ability is essential, especially in the material of geometric shapes which are often considered abstract and difficult for students to understand. Students need to develop a deep understanding of geometric concepts, including shape, size, and relationships between geometric shapes. However, many students have difficulty in understanding the material as a whole. This shows the need for a creative learning approach and to improve student understanding. One of the media that can be used to achieve this goal is stick media. According to Nana Sudiana (2013), the use of appropriate learning media can increase students' interest and understanding, so that it can encourage them to think more critically. Stick media, which is simple and easy to obtain, can be used to describe geometric shapes in a concrete and interactive way, allowing students to learn directly and develop their critical thinking skills. Therefore, this study aims to explore the use of stick media in improving critical thinking skills in spatial geometry material in grade 4 of Elementary School.

Research by Rahmawati (2017) entitled "The Effect of Using Creative Learning Media on Students' Critical Thinking Skills in Mathematics" shows that the use of creative learning media, such as simple teaching aids, can improve students' critical thinking skills. In her research, Rahmawati found that concrete media can help students understand abstract concepts better, and stimulate them to think more critically in solving mathematical problems.

In addition, research by Syamsuddin and Aziz (2020) in the journal "Application of Learning Media in Improving Students' Critical Thinking Skills in Spatial Geometry Material" also showed similar results. They concluded that the use of interactive media that can be seen directly by students can improve their understanding of spatial geometry material. Simple media, such as natural

materials or used goods, can be used effectively to demonstrate the shape and properties of spatial geometry, thereby stimulating students to think critically and analyze these concepts in more depth.

These studies show the importance of choosing the right media in learning, which can facilitate students in developing their critical thinking skills, especially on abstract materials such as geometric shapes. Therefore, this study aims to further examine how the use of stick media can improve students' critical thinking skills on geometric shapes material in grade 4 of Elementary School.

2. Method

This study uses a qualitative research method with a case study approach. Qualitative research aims to understand the phenomena or situations that occur in depth, with a focus on how students interact with learning media, in this case stick media, and how the media can improve students' critical thinking skills in understanding the material on the properties of spatial figures in grade 4 of Elementary School. According to Creswell (2014), qualitative research aims to explore in-depth information about a phenomenon in a particular context, which in this case is the application of stick media in mathematics learning.

This study uses a case study design that focuses on one or more grade 4 classes in an elementary school as the unit of analysis. The case study approach is used to explore in depth the application of stick media in mathematics learning, as well as its influence on improving students' critical thinking skills. Stake (1995) states that case studies provide an opportunity to explore phenomena in a real context and provide a deeper understanding of the processes that occur.

The subjects of this study were grade 4 students in an elementary school that had used stick media in learning the properties of spatial figures. This study will involve several students voluntarily selected based on certain criteria, such as the level of initial understanding of spatial figures and critical thinking skills. Subject determination is done by purposive sampling, namely the selection of subjects based on certain considerations that are relevant to the objectives of the study.

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In this study, data will be collected through the following techniques:

a. Observation: The researcher will conduct direct observation of the learning process involving stick media. Observation aims to monitor how students interact with the media, and how this media helps them understand the properties of geometric shapes.
b. Interview: The researcher will interview teachers and students to gain deeper insight into their experiences in using stick media. This interview aims to explore students' and teachers' perceptions regarding the impact of using stick media on students' critical thinking skills.
c. Documentation: Documentation in the form of notes on observation results and students' work using stick media in making geometric shapes models. This will provide visual evidence of how students form geometric shapes models and explore their understanding of the properties of geometric shapes.
d. Critical Thinking Skills Test: In addition to observation and interviews, the researcher will also give students a critical thinking test after learning, to evaluate the extent to which stick media influences their critical thinking skills in analyzing the properties of geometric shapes.

The procedures in this study include:

a. Preparation Stage:
   - o Develop a learning implementation plan using stick media, which will involve making spatial models.
   - o Prepare structured observation and interview instruments to collect relevant data.
   - o Identify students who will be involved in the research and obtain permission from the school and parents of students.

b. Implementation Stage:
   - o Develop and implement learning using stick media that focuses on making spatial models.
   - o Conduct observations during the learning process to monitor student interactions with the media.

- o Conduct interviews with teachers and students to gain a deeper understanding of their experiences in using stick media.
- o Provide critical thinking ability tests to students after learning to evaluate changes in their abilities.

c. Data Analysis Stage:

- o Data analysis is carried out descriptively qualitatively, by grouping and interpreting the results of interviews, observations, and critical thinking ability tests.
- o Data obtained from observations and interviews will be analyzed to find themes that emerge related to the influence of stick media on students' critical thinking abilities.
- o The results of the critical thinking test will be used to see changes in students' critical thinking abilities before and after using stick media.

Through qualitative research methods with a case study approach, it is expected to provide a deep understanding of the use of stick media in improving students' critical thinking skills in the material of spatial properties in grade 4 of Elementary School. This research is expected to contribute to the development of more effective learning methods, especially in teaching abstract mathematical concepts.

3. Result and Discussion

Research Results

Based on the results of the study conducted with a case study approach on grade 4 Elementary School students, several main findings were obtained related to the use of stick media in improving students' critical thinking skills in the material on the properties of spatial figures.

a. Observation of the Learning Process During the learning process using stick media, it was seen that students were very enthusiastic and active in participating. The stick media used to make spatial figures models allows students to directly see and feel the shape of the spatial figures, such as cubes, cuboids, and triangular prisms. This reduces students'

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difficulty in understanding abstract concepts and improves their understanding of the properties of spatial figures, such as the number of sides, the number of angles, and the relationships between the elements of the spatial figure.

b. Interviews with Teachers and Students The results of interviews with teachers showed that stick media greatly helped students in understanding mathematical concepts, especially the properties of spatial figures. The teacher revealed that by using stick media, students not only listened to explanations, but were also directly involved in the process of making spatial figures models, which made it easier for them to remember and understand the material.Interviews with students also revealed that they found it easier to understand the material on the properties of spatial figures after using stick media. Students felt that learning became more interesting and enjoyable, because they could directly interact with the objects they were studying. Some students also stated that the stick media helped them to think more critically, because they needed to analyze how to connect the sides of the geometric shapes correctly to form the appropriate model.

c. Critical Thinking Skills Test Results Before learning, the critical thinking test showed that most students still had difficulty in analyzing the relationships between geometric elements and understanding the properties of geometric shapes in depth. However, after using stick media in learning, the results of the post-test showed a significant increase in students' critical thinking skills. Students became better able to explain the relationships between sides and angles in geometric shapes and calculate the volume and surface area of geometric shapes more accurately.

Discussion

The use of stick media in learning the properties of spatial figures in grade 4 of Elementary School has been proven to have a positive impact on improving students' critical thinking skills. Based on the results of the study, the use of this

simple but concrete media helps students to better understand concepts that are difficult to understand if only taught verbally or with pictures.

According to Ennis (2011), critical thinking involves the ability to analyze and evaluate information objectively. In the context of mathematics learning, concrete media such as sticks can clarify abstract concepts, helping students to think more analytically and evaluatively. By making their own spatial figures models, students not only learn to memorize the characteristics of spatial figures, but are also invited to think about how these elements are interconnected (Sari, & Sayekti, 2023).

The results of interviews with teachers and students showed that learning became more interesting and interactive, so that it could increase students' motivation to think more critically. This is in line with the opinion of Arends (2012), who stated that learning that involves direct interaction with learning objects can encourage students to think more deeply and critically. Through the use of stick media, students can more easily imagine and concretize the properties of spatial figures that were initially abstract, so that their understanding of the material becomes stronger (Bean, & Melzer, 2021).

The increase in critical thinking skills is also reflected in the results of the post-test which showed a significant increase after learning using stick media. This proves that stick media can stimulate students' critical thinking skills, helping them analyze and solve problems related to spatial figures more effectively. As stated by Facione (2015), critical thinking involves assessing and synthesizing information, which can be obtained through direct experience and problem-based learning (Aulia, & Cinantya, 2023).

Overall, this study shows that stick media, although simple, has great potential in helping students understand the properties of spatial figures and improve their critical thinking skills. This media provides a more concrete and enjoyable learning experience, so that students not only gain knowledge, but also develop critical thinking skills that are very important in learning mathematics (Fitria, 2023).

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The use of stick media in learning can also be an effective alternative for teachers to improve the quality of mathematics learning, especially in understanding the material on the properties of spatial figures . With a more active approach and involving students in making spatial figure models, it is hoped that it can create a more enjoyable and in-depth learning environment (Noor, & Cinantya, 2023).

4. Conclusion

Based on the results of the research conducted, it can be concluded that the use of stick media in learning the material on the properties of spatial figures in grade 4 of Elementary School has proven effective in improving students' critical thinking skills. Stick media, which is simple but concrete, allows students to better understand abstract concepts, such as the relationship between sides, angles, and other elements in spatial figures. The use of stick media in learning provides students with direct experience in making spatial figures models, which not only makes it easier for them to understand, but also encourages them to think analytically, evaluate information, and solve problems in a more critical way. This is in accordance with the critical thinking theory put forward by Ennis (2011) and Facione (2015), which emphasizes the importance of students' ability to analyze and assess information objectively.

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