

The Implementation of Tangram Puzzle to Enhance Creativity of First Grade Elementary School Students

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1. Abstract

The development of knowledge and technology is advancing rapidly in this modern era. One of the 21st-century skills that students must possess is creativity. This research aims to: (1) describe the implementation of the tangram media in enhancing creativity in geometry subjects in the first grade of elementary school, and (2) determine the improvement of students' creativity through the application of the tangram media in geometry subjects in the first grade of elementary school. This research adopts a classroom action research with a model developed by Kemmis and McTaggart. The model follows a process of spiral self-reflection, starting from planning, action, observation, and re-planning. The research was conducted in an elementary school with first-grade students as the research subjects. The data collection technique used in this study is observation. The data analysis technique employed includes qualitative and quantitative descriptive analysis. The research results demonstrate that learning using the tangram media has shown improvement. The pre-cycle research results showed an average student creativity score of 39%. In cycle I, the average student creativity score reached 46%, which had not yet reached the expected success indicator. Therefore, the study continued to cycle II. In cycle II, the average student creativity score increased to 77%, surpassing the expected success indicator of 75%. As a result, the research was concluded after cycle II. Based on the percentage obtained in cycle II, it can be concluded that the use of the tangram media effectively enhances the creativity of first-grade students in the 2022/2023 academic year.

Keywords: Creativity, tangram puzzle, elementary school

2. Introduction

Various changes have been implemented in order to achieve the national education goals. One of the policies is to transform the 2013 curriculum into the independent curriculum (Angga et al., 2022). Within the independent curriculum, there is a dimension called the Pancasila learner profile. The Pancasila learner profile dimension consists of the characters and competencies that educational units need to develop for students. The dimensions of the Pancasila learner profile are (1) being faithful, devoted to the One Almighty God, and possessing noble character, (2) being globally tolerant, (3) fostering mutual cooperation, (4) being independent, (5) being critical thinkers, and (6) being creative (Irawati et al., 2022). All learning, programs, and activities in educational units aim to achieve the Pancasila learner profile. Classroom learning practices are also expected to support the achievement of the Pancasila learner profile by incorporating it into the teaching process (Zuriah et al., 2022).

Mathematics is a subject that exists at all levels of education, from elementary school to university. By learning mathematics, we will learn about critical, creative, and active reasoning (Nurulaeni et al., 2022). Mathematics is important to be taught to elementary school students because it is a discipline directly related to all human daily activities (Fendrik, 2019:703). Therefore, it is essential for elementary school students to learn mathematics to solve problems in their daily lives. As stated by Maulidiyah (2015:2), everyone needs to learn mathematics because it is a tool for solving everyday problems. Hence, an appropriate learning media is needed for use in mathematics education (Hasiru

et al., 2021) and should be tailored to the taught material to achieve the learning objectives.

Creativity is one of the aspects that can be honed in the subject of mathematics (Fitri and Sari, 2020). Teachers play a crucial role in the learning process. Besides being educators and imparting knowledge, teachers also have a role in developing creativity in students (Asari et al., 2021). The learning process can be considered effective when all influencing components during the learning process support and relate to each other in order to achieve learning objectives (Fakhrudin et al., 2023). Quality learning is learning that is attractive, enjoyable, motivating, and encourages students to be more active during the learning activities. This can happen when teachers can use engaging learning media that not only captivate students but also help develop their creativity (Susilo & Sofiarini, 2020).

One of the efforts that teachers can take to achieve their goals is by using learning media. Firmandani (2020) states that learning media is an educational tool that can be used to aid the teaching and learning process, as well as to foster students' learning motivation. It encompasses all objects and environments surrounding the students that can be utilized in the learning process. Teachers can select learning media that align with the characteristics of the students and the material to be taught (Ani, 2019).

Based on the observations conducted during the implementation of the second field experience (PPL 2) in May to June 2023 in a first-grade elementary school classroom, several issues were identified. The problems in the classroom include: The teaching method used is still conventional and teacher-centered, Lack of varied and diverse use of learning

media, Insufficient encouragement of students' creativity during the learning process, Limited opportunities for students to explore mathematical learning, leading to reduced student engagement and activeness in the classroom, Students' creativity is found to be lacking during mathematics lessons. When given the chance to express ideas or innovations, students are unable to present ideas other than those provided by the teacher, even though the curriculum encourages students to have creative abilities.

Overall, there is a need for improvements in the teaching methods and learning environment to foster creativity and active participation among the students during mathematics lessons.

Based on the above issues, a suitable solution is needed to achieve the learning objectives. One of the solutions that can be implemented is using media that can enhance students' creativity (Hasanah, 2019). Tangram is a puzzle game from China that consists of seven flat shapes. These seven pieces can be arranged and combined to form various patterns such as pictures of cats, fish, houses, and more (Bohning and Althouse, 1997: 239). Based on the research conducted by Mufti et al. (2020), tangram has several benefits in geometry learning, including: Enhancing students' creativity, Improving students' understanding of geometric concepts, Providing a concrete visual representation of flat shapes for students, Increasing students' interest in learning about flat shapes, Improving students' learning outcomes in the study of flat shapes, By incorporating tangram as a learning media, it is hoped that the students' creativity and engagement in mathematics learning will improve, and they will have a better understanding of geometric concepts.

This can lead to a more effective and enjoyable learning process and contribute to achieving the learning objectives.

The use of tangram as a learning media has been proven to enhance students' creativity. This can be seen from previous research conducted by Ismatul Maula (2020) who used tangram media to improve the mathematical creativity of fourth-grade students in MI Al Hidayah Kebayoran Lama Jakarta. The research results showed that the improvement in mathematical creativity based on the creative thinking ability test was 52% in the pre-cycle, then increased to 80% in cycle I, and reached 100% in cycle II. Meanwhile, based on the performance test (creating tangram), the results showed 52% in the pre-cycle, then increased to 68% in cycle I, and 100% in cycle II. This research is essential as it provides valuable information on how tangram media can enhance students' creativity. Therefore, the aim of this research is to determine the improvement of students' creativity through the use of tangram media.

3. Methods

3.1. Participants and context

The subjects of this research are first-grade elementary school students, totaling 7 children, consisting of 3 male students and 3 female students. The first-grade students also include regular students and students with disabilities (ABK). The number of regular students is 4, and the number of students with disabilities is 3. The focus of this research is on improving students' creativity in the subject of mathematics by using tangram media.

3.2. Material

The research instrument used in this study is an observation guide. The observation guide is utilized to measure students' creativity during the learning process using tangram media. Observation is a data collection technique that involves gathering materials and information through systematic observation and recording of various phenomena that are the object of observation or indicators of the research variables (Djaali, 2020).

3.3. Data Collection and analysis

The data collection in this research is conducted through the cycles according to Kemmis & McTaggart (2014), which consist of planning, action, observation, and reflection. The research is considered successful, and the cycle will be stopped if there is an improvement in students' creativity from one cycle to the second cycle. The action is deemed successful if at least 75% of the students show creativity during the learning process. The data analysis techniques used in this research are quantitative and qualitative descriptive analysis. Quantitative descriptive analysis is used to analyze the data by calculating the percentage of students' creativity after using the tangram media in learning. Qualitative analysis is used to describe the learning outcomes. The results of students' creativity are calculated by dividing the total score obtained by the maximum score and then multiplied by 100.

The data analysis technique for students' creativity is as follows

$$\% \text{ Score of students' creativity} = \frac{\text{total score obtained}}{\text{maximum score}} \times 100\%$$

Tabel 1 Criteria for Students' Creativity Scores

No	Result of students' creativity percentage.	Criteria
1.	85,01 % -100,00%	Very high
2.	70,01 % - 85,00 %	High
3.	50,01 % - 70,00 %	Moderate
4.	01,00 % -50,00%	Low

(sa'dun Akbar, 2013: 157)

3.4. Limitations to the Study

The limitations in this research that should be taken into consideration for future studies are related to the research object and subject. The object of this study is limited to students' creativity, whereas the implementation of tangram media may also have an impact on other variables that need further investigation. The subjects of this study are only 7 first-grade students, which means the research cannot be generalized to a larger population.

4. Results and Discussion

4.1. Result

The research begins with a pre-cycle or pre-research activity by observing the learning process in a first-grade elementary school classroom. Based on the observation results, it can be concluded that the learning process still uses conventional teacher-centered methods, lacks the use of varied media, does not foster students' creativity, and limits students' opportunities to explore mathematical learning, leading to reduced student engagement and activeness in the classroom.

In addition to observing the learning activities, pre-action data is also obtained by conducting pre-cycle learning practice without using tangram media to determine the initial level of students' creativity in geometry, the subject of mathematics. The pre-cycle was conducted on Wednesday, April 12, 2023. The results of students' creativity observation can be seen in the following table.

Table 2: Pre-Cycle Observation Results of Students' Creativity

No.	Students	Level of Creativity	Remarks
1.	ARZ	31%	Low
2.	AYPP	37%	Low
3.	DB	56%	Moderate
4.	NWAS	31%	Low

5.	NRM	25%	Low
6.	NAPA	62%	Moderate
7.	RHR	31%	Low
Average		39%	Low

Assessment Criteria:

Very high : 85,01%-100,00%

High : 70,01%-85,80%

Moderate : 50,01%-70,00%

Low : 01,00%-50,00%

Based on Table 4.1, it is known that in the pre-cycle learning of geometry material in mathematics with 7 students as participants, there are 2 students or 28% who have a creativity level above 50%, while 5 students or 71% have a creativity level below 50%, and none of the students have a creativity level above 70%. Based on the pre-cycle results and reflection discussions with the class teacher, the researcher identified the low level of students' creativity was due to the lack of available learning media used by the teacher during the learning process. Therefore, an action research needs to be conducted by implementing tangram media to improve students' creativity levels.

Tabel 3 Creativity Skill Percentage of Students

No	Indicator	Cycle 1		Cycle 2		Criteria
		Session 1 (%)	Session 2 (%)	Session 1 (%)	Session 2 (%)	
1.	Original thinking skills (Originality)	25	35	71	82	High
2.	Flexibility in thinking (Flexibility)	53	60	75	78	High
3.	Fluency in thinking (fluency)	50	57	82	85	High
4.	Detailed thinking skills (elaboration)	42	46	71	75	High
Total		46		77		

Based on the observation results conducted in cycle I and cycle II regarding the creativity skills of the students, it was found that the achievement was 46% in cycle I and 77% in cycle II. With the attainment of 77% in cycle II, the cycle was terminated as it has

reached the success criteria. Therefore, the research is deemed sufficient and it does not need to proceed to the next cycle.

4.2. Discussion

The research results prove that the tangram media can enhance students' creativity in learning mathematics. The research was conducted in two cycles, with each cycle comprising two meetings. The implementation of the learning process includes three main activities: the opening activity, the core activity, and the closing activity.

In the first cycle, the research did not show success, as the creativity observation sheet score of the students was at 46%, which falls under the low category. However, in the second cycle, it demonstrated success, as the creativity observation sheet score of the students reached 77%, meeting the target for success. In this study, the measurement of students' creativity ability was assessed through indicators of original thinking skills (originality), flexibility in thinking (flexibility), fluency in thinking (fluency), and elaboration skills (elaboration).

The ability to think originally means that students can create works based on their own thinking. In the first cycle, the students' original thinking ability was still low because on average, they still needed assistance with ideas from the teacher or their peers. However, in the second cycle, the students were able to create works based on their own thinking without requiring much help from others.

The ability to think flexibly means that students can create works with various alternative ideas that are organized in their minds. In the first cycle, on average, students were not yet able to create works based on the ideas organized in their minds; some of

them sought inspiration by observing their surroundings. However, in the second cycle, the students were able to create works from the ideas organized in their minds.

The ability to think fluently means that students can create tangram according to the stages smoothly. In the first cycle, students still needed assistance and experienced interruptions while creating their works. However, in the second cycle, the students became more fluent, and only a few of them needed assistance in creating their works.

The ability to think in detail means that students can arrange patterns in a very detailed manner into a work. In the first cycle, students were not yet able to arrange patterns in a very detailed manner into their works. However, in the second cycle, the students showed more precision and attention to detail in creating their works.

5. Conclusion

The use of tangram media can enhance the creativity of students in the first grade of elementary school in the subject of mathematics. The improvement in students' creativity is demonstrated by the increase in the percentage of their creativity. In cycle 1, the percentage of students' creativity reached 46%. Then, in cycle II, the percentage of creativity increased to 77%. This indicates that the students' creativity has improved and achieved the predetermined success indicator.

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