

Implementation of the Media-Assisted TGT Cooperative Model Rolling Ball To Improve Capabilities Mathematical Creative Thinking

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Abstract

This study aims to improve students' creative thinking skills on social arithmetic material through the application of the TGT cooperative model assisted by rolling ball media to improve mathematical creative thinking skills. The subjects of this study were students of class VII MTs Nurul Yaqin Sukawangi. This research is class action research. The analysis technique is quantitative descriptive. Pre-cycle data showed that the percentage of students who completed the mathematics test was 8% which was classified as a category of less, so learning was carried out with the TGT cooperative model assisted by rolling ball media. In cycle I, the percentage of students who completed the creative thinking ability test was 40%. The students' creative thinking ability in cycle I had not reached the specified classical, so it was continued in cycle II. Students' creative thinking ability in cycle II was 88%. These results were above the percentage of classical completeness that had been determined to be 75%, so this research stopped at cycle II with a percentage of 88%. Thus, it can be concluded that the application of the TGT cooperative model assisted by rolling ball media can improve students' creative thinking skills.

Keywords: creative thinking ability, rolling ball, TGT cooperative

1 INTRODUCTION

Education has an important role in the development of a nation. Education can create quality human resources (Widiansyah et al, 2018). The objectives are contained in Law No. 20 of 2003 article 3 concerning the National Education System which states "National education functions to develop abilities and develop the character and civilization of the nation, aiming to develop the potential of students so that they become human beings who believe and are devoted to God Almighty, have good morals. noble, healthy, knowledgeable, creatively capable, independent, and a democratic and responsible citizen (Meiliasari et al, 2022)." Mathematics is a basic science that is used in every human life, including, mathematics is the basis for the development of modern technology, mathematics has an important role in various scientific disciplines and the advancement of human thinking (Nabilah et al, 2020). Mathematics is a mandatory subject at every level of education. Solihah and Mahmudi stated that almost all daily human life always uses mathematic (Sholihah & Mahmudi, 2015). Mathematics is not the science of obtaining solutions based on information available through knowledge and experience regarding calculations whose main characteristics are logical, systematic, consistent and require creativity (Yuliana et al, 2015).

In the 21st century, mastering basic skills such as reading, writing and mathematics alone is not enough and a qualified workforce is needed that is able to solve intellectual and technical problems. In this way, educational programs should be organized for individuals to acquire 21st century skills and competencies such as critical thinking skills, creativity, collaboration, and problem solving (Koculu et al., 2022; Siahaan et al, 2023).

According to this expert's opinion, the author will examine the focus on mathematical creative thinking abilities. (Zuhriyah, 2022). According to several experts, students think to achieve fluent thinking skills, flexible thinking skills, original thinking skills, elaboration skills, and assessment skills which are characteristics of creative thinking abilities. Mathematical creative thinking ability is the ability to produce new and innovative ideas in a mathematical context, such as finding patterns, creating new problem solving strategies, and thinking outside conventional boundaries (Anisa et al, 2022).

To achieve students' thinking abilities above, teachers must be able to design learning activities that can motivate students to practice creative mathematical thinking. Teachers can design various learning models, but they must be adapted to students' circumstances. Therefore, researchers collaborating with teachers will apply a cooperative type learning model Teams Games Tournament. According to experts in (Alawiyah et al, 2023) that cooperative learning Teams Games Tournament is a type of cooperative learning that places students in study groups consisting of four to five students who have different abilities, genders and ethnicities or races. (Khaulah, 2022; Nurhasanah, 2016; Sulistyawan & Sholeh, 2021), this reinforced by (Rusman, 2018) that it is a learning process Teams Games Tournament This begins with the delivery of learning objectives, delivery of material, group discussions, group tournament activities, and ends with group awards. Experts have implemented a type of cooperative learning model team games tournament (TGT) to improve learning outcomes shooting football (Triyudho et al. (2017;Perdana et al, 2023), but for this research, researchers will apply Cooperative learning Team Games Tournament assisted by the media Rolling Ball to improve mathematical creative thinking abilities. According to (Huda, M., & Cacik, S. 2023). Media Rolling Ball is a ball development media that is taught using games that aim to change students' way of thinking in learning and make learning something interesting and fun. By applying this media, students can change their perspective to be creative, enthusiastic and confident in learning.

Reasons for researchers to apply the cooperative model team games tournament media assisted rolling ball, because researchers have carried out observations and discussions with mathematics subject teachers at MTs. Nurul Yaqin Sukawangi regarding the problem of mathematics learning outcomes in social arithmetic material which is still below the KKM. This is because teachers are faced with several problems as follows: (1) there is no teaching material that supports improving creative thinking abilities; (2) the teaching materials used are still conventional methods such as worksheets, whiteboards and markers; (3) the lecture method used does not make students comfortable in learning, some students do not understand mathematics learning, especially in Social Arithmetic material. (4) The lack of innovative learning media facilities also affects the learning process, ultimately students' understanding of the concepts of learning material is still lacking, apart from that, students are less independent during the learning process and only wait for the teacher's orders; (5) Some students feel afraid when they have to express their ideas and opinions, ultimately students' creative thinking abilities are low and difficult to develop. Students' creative thinking abilities in the learning process only reached an average of 37.4 with a completion percentage of 8%. This result shows that students' creative thinking abilities are still low.

Based on the theory and problems above, the researcher formulated the research problem as follows: how to improve the mathematical creative thinking abilities of class VII students at MTs Nurul Yaqin Sukawangi by implementing a cooperative model team games tournament media assisted rolling ball.

2 RESEARCH METHODS

This research was carried out at MTs Nurul Yaqin Sukawangi which is located at Jl. Swadaya no 2 kp kalen kacing Sukatenag Village, Sukawagi District, Bekasi, involving 25 MTs class VII students. This research was carried out in the Even Semester of the 2023/2024 Academic Year. This research used Classroom Action Research (Classroom Action

Research) version model Kurt Lewin. Class Action Research is a series of steps consisting of four stages, namely planning, action, observation and reflection (Susilo, H., Chotimah, H., & Sari, Y. D. (2022). The purpose of classroom action in this research is to improve learning process with the ultimate goal of improving the creative mathematical thinking abilities of class VII students team games tournament assisted media rolling ball, in social arithmetic material which consists of 2 (two cycles). Each action cycle is carried out following the procedures developed by kurt lewin as shown in Figure 1.

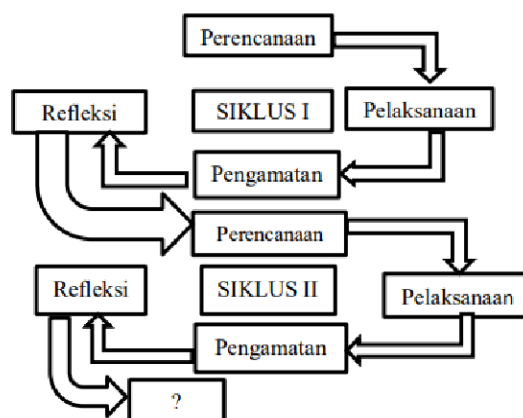


Figure 1. Model of CAR Implementation Stages

It can be seen from Figure 1 that the classroom action research procedure carried out consists of stages: (1) Planning; (2) Implementation; (3) Observation, and; (4) Reflection. Before the class action is carried out, the researcher first carries out a pre-action stage which aims to divide the learning material into two planned cycles, and determine initial conditions as a basis for measuring the increase in mathematical creative thinking abilities.

This classroom action research involved 25 students in one class and the researcher himself acted as a teacher. The other party involved was a senior mathematics teacher at the school who acted as an observer. Research data was collected using written test instruments, observation, interviews, and documentation. The written test instrument developed contains indicators of creative thinking abilities from (Erika, E., & Suripah, S. 2022), which consists of; (1) Flexibility; (2) Flexibility; (3) Elaboration; (4) Authenticity, and; (5) Evaluation. Observations were carried out using an observation sheet which contained indicators: (1) student enthusiasm in learning; (2) student participation in group work; (3) students' activeness in discussing with friends; (4) ability to express opinions, and; (5) pay attention to the class in the learning process. The interviews were conducted using the indicators contained in the interview guide. The data obtained is then processed until a conclusion is drawn.

3 RESULT AND DISCUSSION

Before taking action, the researcher carried out a pre-action stage which consisted of determining initial conditions and distributing the material to be taught in each cycle. Determining the initial conditions is done by giving pre-cycle questions, the results of which are presented in the following figure:

Table 1. Pre-Cycle creative thinking ability test scores

Instrument	Results
Score	37,4
Completed (%)	8%
Incomplete (%)	92%

It can be seen from Figure 1 that the classroom action research procedure carried out consists of stages: (1) Planning; (2) Implementation; (3) Observation, and; (4) Reflection. Before the class action is carried out, the researcher first carries out a pre-action stage which aims to divide the learning material into two planned cycles, and determine initial conditions as a basis for measuring the increase in mathematical creative thinking abilities.

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3.1 Results

This class action research consists of 2 cycles, each cycle consists of 5 meetings. in each cycle through several stages, namely planning, actuating, observing and reflecting.

3.1.1 Class Action Results in Cycle 1

Cycle I was held for 5 meetings with each meeting lasting 1 hour of study. The first meeting on May 6 2024 discussed the learning process and profit and loss material, profit and loss percentages, the second meeting on May 7, 2024 discussed gross, net and tare material, the third meeting on May 13, 2024 discussed discount material, the fourth meeting on On May 14, 2024, the learning process used rolling ball media, and at the fifth meeting on May 15, 2024, cycle I tests were held. The following is an explanation of the results of actions based on the research stages in cycle I.

a. Results of the Planning Stage

The results of the planning stage are: (1) Learning Implementation Plan (RPP) and syllabus with material discussing profit and loss, percentage of profit and loss, gross, net, tare and discount; (2) developing a cycle posttest instrument consisting of 5 questions; (3) compiling observation sheets; (4) compiling an interview sheet; (5) dividing student groups according to the needs of implementing the TGT cooperative model, and; (6) prepare for the game rolling ball.

b. Implementation Level Results

At the implementation stage of the first meeting, the researcher started the learning activity by praying and checking attendance, then informed the results of the division of study groups which were divided into 5 groups consisting of 4-5 students. Next, the researcher provides material and explains the material provided, then the researcher holds a tournament in the form of questions that have been studied, and finally the researcher gives individual assignments as practice at home to strengthen understanding. At the second meeting, learning activities were carried out by forming groups of 4-5 students, providing and explaining learning material on the subject of gross, net and tare, and holding a tournament. At the third meeting, learning activities were carried out as in meetings 1 and 2, learning activities were to form groups of 4-5 students, provide and explain learning material with the subject of determining discounts, and holding tournaments. At the fourth meeting, a tournament learning process was carried out using media rolling ball in the discussion of the material for meetings 1, 2 and 3. Then at the fifth meeting questions will be given on the cycle I creative thinking ability test.

At the fifth meeting, a creative thinking ability test was carried out, which was attended by 25 students. The posttest went smoothly and the results are presented in Table 2.

Table 2. Cycle I Creative Thinking Ability Test Scores

Instrument	Results
Test Score	60
Completed (%)	40%
Incomplete (%)	60%

Table 2 shows that 40% of students reached the Minimum Graduation Criteria (KKM) and 60% of students did not complete it. Meanwhile, the success criteria set are 75% of students completing the KKM. This shows that students' mathematical creative thinking abilities in cycle I are still low and need to be carried out in the next action process.

c. Results of the Observation Stage

Based on the results of observations of students, it is known that each student shows different behavior when receiving learning. Based on the observation sheet, it can be shown that the percentage of students' creative thinking abilities in cycle 1 is 71%. Based on observations, it was also found that students who were less enthusiastic were aimed at students who were just silent when learning was taking place, and it was also found that students who were not confident were aimed at students who were still shy. -embarrassed to express his opinion. The results of the observer's observations show that researchers as teachers need to increase learning activities in the hope of making students more focused on the problems they face.

d. Reflection Level Results

Based on the results of observations, several things that need to be improved in cycle 2 actions include educators providing guidance to students who are less active in learning activities by taking an individual approach, apart from that educators must be more creative in provoking students' courage to convey material they have not yet understood. Through this improvement, it is hoped that learning outcomes in cycle 2 will improve.

3.1.2 Cycle II Class Action Results

Cycle II was held for 5 meetings with each meeting lasting 1 hour of study. The first meeting on May 20, 2024 discussed the learning process and material on selling and purchasing prices, the second meeting on May 21, 2024 discussed single interest material, the third meeting on May 27, 2024 discussed tax material, the fourth meeting on May 28, 2024 learning process by applying media rolling ball, and the fifth meeting on May 29, 2024 carried out cycle II tests. The following is an explanation of the results of actions based on the research stages in cycle II.

a. Results of the Planning Stage

The results of the planning stage are: (1) Learning Implementation Plan (RPP) and syllabus with material discussing profit and loss, percentage of profit and loss, gross, net, tare and discount; (2) developing a cycle posttest instrument consisting of 5 questions; (3) compiling observation sheets; (4) compiling an interview sheet; (5) dividing student groups according to the needs of implementing the TGT cooperative model, and; (6) prepare for the rolling ball game.

b. Implementation Level Results

At the implementation stage of the first meeting, the researcher started the learning activity by praying and checking attendance, then informed the results of the division of study groups which were divided into 5 groups consisting of 4-5 students. Next, the researcher provides material and explains the material provided, then the researcher holds a tournament in the form of questions that have been studied, and finally the researcher gives individual assignments as practice at home to strengthen understanding. At the second meeting, learning activities were carried out by forming groups of 4-5 students, providing and explaining learning material on the subject of single interest, and holding a tournament. At the third meeting, learning activities were carried out as in meetings 1 and 2, learning activities were forming groups of 4-5 students, providing and explaining

learning material on the subject of determining taxes, and holding tournaments. At the fourth meeting, a tournament learning process was carried out using media rolling ball in the discussion of the material for meetings 1, 2 and 3. Then at the fifth meeting questions will be given on the cycle II creative thinking ability test.

At the fifth meeting, a creative thinking ability test was carried out, which was attended by 25 students. The posttest went smoothly and the results are presented in Table 2.

Table 3. Cycle II Creative Thinking Ability Test Scores

Instrument	Results
Test Score	82,4
Completed (%)	88%
Incomplete (%)	12%

Table 3 shows that 88% of students achieved the Minimum Graduation Criteria (KKM) score and 12% of students did not complete it. Meanwhile, the success criteria set are 75% of students completing the KKM. This shows that the students' mathematical creative thinking abilities in cycle 2 have met the researchers' expectations with a percentage of more than 75%.

c. Results of the Observation Stage

Based on the results of observations of students, it is known that each student shows different behavior when receiving learning. Based on the observation sheet, it can be shown that the percentage of students' creative thinking abilities in cycle 1 was 76%, while the results of the observer's notes and observations of students in learning were quite good.

d. Reflection Level Results

Based on the results of observations in cycle 2, both student learning outcomes and the level of students' creative thinking abilities have both increased, and both have achieved the success criteria expected by the researchers. Therefore, this classroom action research was not continued in the next cycle, and this research was considered successful.

3.2 DISCUSSION

Classroom Action Research (CAR) was conducted over two cycles, adhering to the systematic research procedures outlined in this study. The research process, in general, proceeded smoothly and was free from significant obstacles.

Prior to the intervention, a pre-cycle assessment was carried out to evaluate the initial competency levels of the students. The results of this pre-cycle revealed that only 8% of students were able to meet the Kriteria Ketuntasan Minimal (KKM). This low achievement rate highlighted a clear need for instructional improvement and became the driving rationale for implementing the action research cycles.

Through these cycles, a series of targeted interventions were designed and applied, aiming to address the specific challenges faced by students and to enhance their learning outcomes. The findings from each cycle were continuously analyzed and used to refine subsequent strategies, ensuring a responsive and adaptive approach to improving classroom performance.

The results of providing action in the form of implementing the TGT cooperative model assisted by rolling ball media in cycle I were shown by the results of the student's mathematical creative thinking ability test reaching a KKM of 40%. Next, the researchers made improvements to the learning process in cycle 2, showing that there was a further increase in the results of students' mathematical creative thinking ability tests, namely students achieved a KKM of 88%. In general, the increase in students' mathematical creative thinking abilities from cycles 1 and 2 is presented in Figure 2.

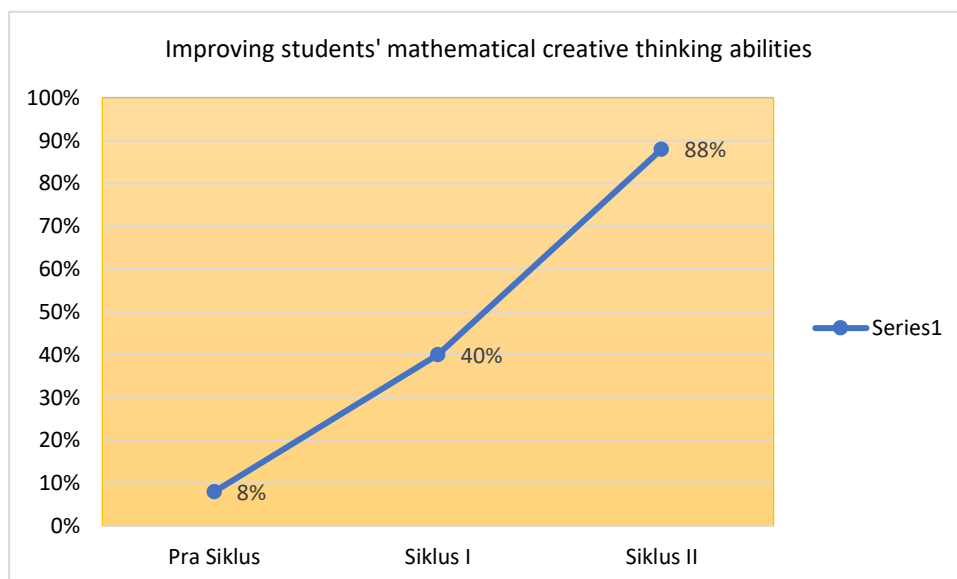


Figure 2. Increase in Creative Mathematical Thinking Ability in Each Cycle

Based on Figure 3, researchers have been able to show an increase in creative thinking abilities in each cycle. In cycle 2, it was seen that 88% of the students had creative mathematical thinking abilities, which shows that the learning process carried out had reached the specified criteria for completeness, namely 75%. If you calculate the increase in mathematical creative thinking abilities, from cycle 1 to 2 it increased by 48%.

Based on the description above, researchers can show that providing classroom action through the application of the TGT cooperative model with media assistance rolling ball can improve creative mathematical thinking skills in class VII social arithmetic material.

4 CONCLUSION

Based on research data obtained from the results of Classroom Action Research (CAR) at MTs Nurul Yaqin Sukawangi using 2 cycles, it can be concluded as follows:

There is an increase in students' mathematical creative thinking abilities in class VII social arithmetic material with the TGT cooperative model assisted by media rolling ball can be seen from the data in each research cycle carried out. Pre-Cycle average score was 37.4 and completion score above KKM was 8%. Cycle I experienced an average increase of 60 and completion of scores above the KKM of 40%. Meanwhile, in Cycle II there was an increase in the average score of 82.4 and the completion of the score above the KKM was 88%. So it can be concluded that the class action is in the form of implementing the TGT cooperative model with media assistance rolling ball can improve students' creative mathematical thinking abilities, especially in social arithmetic material. Thus, the research carried out has achieved the stated research objectives.

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