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Involving students and prospective mathematics teachers through the use of the think pair share design: The impact on increasing students' activity and learning outcomes in plane geometry

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Abstract

This research aims to determine the increase in student activity and learning outcomes in flat building materials through the use of the think pair share (TPS) design. The research design used to achieve the objectives of this research was classroom action research conducted at SMP Negeri 1 Indramayu. Apart from that, the subjects in this research were 32 students in class VII B, while the instruments used in this research were student observation sheets which aimed to measure activity and formative tests given each cycle. Next, deep data analysis study uses pattern study quantitative descriptive for measure enhancement results Study mathematics students through test formative and measuring enhancement activities carried out every cycle. The results of data processing on learning outcomes obtained an average of 65.09 for cycle I, cycle II of 74.07, and cycle III of 80.45. Likewise, the increase in the number of students reaching completeness Study that is from cycle I as much 5 students out of 32 students or 22%, cycle II as many as 15 students out of 31 students or 47% of the criteria high completeness, and in cycle III there were 26 students out of 31 students or 81% included in the category the criteria for completeness are very high. Next, based on the results of data processing of student activity during the learning process obtained that cycle I had not reached the active category (A) (24 students out of 32 were inactive or 25% from target 75% so cycle I Not yet reach category active). In Cycle II there was an increase from Cycle I to reach the active category (A), namely 20 students were active in the learning process and 11 students were still not actively involved in the learning process. Additionally, in Cycles III there was a significant increase in reaching the active category (A), namely, there were 25 students, or 81% of students involved in the learning process, while the rest were still not active. This matter shows that using the Think Pair Share (TPS) design through the involvement of students and mathematics teachers can increase student activity and learning outcomes in plain material.

1. Introduction

Mathematics is one of the most important subjects that must be studied at all levels of education, from elementary school to college (Tanujaya et al., 2017). This is because mathematics is a branch of knowledge that students need to achieve learning success in the future. Laurens et al. (2018) also stated that mathematics can help study other sciences such as economics, accounting, chemistry, physics, and others. This can have an effect if students

experience difficulties in learning mathematics. The importance of mathematics can equip students to be able to think logically, critically, analytically, symmetrically, and carefully and to be able to use creative thinking patterns in everyday life (Foley et al., 2017) .

Fritz & Butterworth (2019) stated that in general mathematics is often considered difficult by most students so many students feel afraid when studying mathematics. Students who consider mathematics to be a difficult subject and seem boring generally hurt students' mathematics learning outcomes (Tanujaya et al., 2017) . Nindya & Purnami (2018) also stated that complicated concepts in mathematics lessons can cause students to be reluctant to try to construct their understanding. This results in students being less active in participating in learning and low student mathematics learning outcomes. Students who learn with their learning style will have better mathematical communication skills. Not all individuals have good communication, especially mathematical communication. According to Latifah & Luritawaty (2020), mathematical communication skills depend on the ability to collect, organize, and explain thoughts, discover what is known and what is not known, and think clearly.

Low activity and learning outcomes need to be addressed by selecting appropriate learning techniques. One effort that teachers can make to increase student activity and learning outcomes is by choosing the right learning model. The choice of learning model must be adjusted to the material to be delivered, if the model applied does not match the level of difficulty of the teaching material it will cause asymmetry in the learning process (Isnawan & Sudirman, 2022) . Interesting learning can foster student learning motivation so that student learning outcomes will increase (Hutagalung, 2017; Runisah et al., 2023) . A learning model is a plan or pattern that we can use to design face-to-face teaching patterns in the classroom, to determine learning materials or tools including books, learning media, and curriculum (Hadi et al, 2020; Nandang et al al., 2023; Sudirman et al., 2020) .

In the world of education, especially in Indonesia, a learning model with a contextual approach is being developed, one of the characteristics of which is cooperation or what is also called a group learning strategy or cooperation (Supomo, 2018) . It is necessary to implement more precise and interesting learning, where students can learn cooperatively, ask questions even if not to the teacher directly, express opinions, and increase student interaction (Sari & Arnida, 2019) . The application of the *Think Pair Share* cooperative learning model in mathematics learning activities makes students active, interacting with each other and working together to understand the mathematical concepts being studied (Latifah & Luritawaty, 2020) .

According to Prathiwi (2014), using the *Think Pair Share* type cooperative learning model, students can build good interactions and social processes in the teaching and learning process and increase student activity in learning by discussing in class. Safitri et al (2019) stated that the *Think Pair Share* learning model is a learning model that can help motivate students in the learning process. This learning model aims to facilitate information management, and communication, and develop students' way of thinking in participating in learning. So, it can be concluded that the *Think Pair Share learning model* is a learning setting in the form of variations that requires students to think independently, then discuss it with their discussion partners, and then present it to other groups to share the tasks that students have done previously (Rosita & Leonard, 2015; Ribut, 2021).

Based on the description above, it can be concluded that the problem that is often faced in the process of teaching and learning activities, especially in the field of mathematics studies, is that there are still many students who think that mathematics is a difficult subject which results in students being less active in participating in learning activities so that student learning outcomes are low. Therefore, to increase student activity and learning outcomes, a teacher carrying out learning activities is required to be able to create creativity and create a pleasant atmosphere during the learning process. One effort that can be made

is to apply learning methods or models. For this reason, in this classroom action research activity, researchers used the *Think Pair Share* learning model to increase student activity and learning outcomes.

2. Method

The research method used in this research is *Classroom* Action Research. Study This is done to give repair in a way direct to the problem Which happened in junior high school Country 1 Indramayu. Besides That find a solution new to the problem at hand. In this way, it is hoped that this will enhance the liveliness And results study on opportunity material with implemented modellearning cooperative type Think Pair Share.

Implementation study Which will be used in several cycles gradually. The stages in each cycle will always be evaluated and analyzed to determine the extent of the impact of providing that method given to serve as a comparison for the next cycle. Research stages steps that have been taken in this classroom action research, namely planning, implementing, observation, and reflection. The cycle will be held in a way that *continues* until the researcher findssolutions that can change the learning process for the better so that problems that happen can repaired And resolved with optimal. Apart from that, researchers will also obtain alternative solutions to determine the action plan that will be implemented in the next action.

Study This was done in junior high school Country 1 Indramayu class VII B, namely the school where the Introductory Program takes place Field (PPL) so that the writer already knows the environment school, characteristics, and abilities his students, material principles in the study This is two-dimensional figure with sub principal The discussion is rectangular and circular shapes. Based on counting techniques, the subjects to be researched are students in class VII B, totaling 32 students Who get learning material. The researcher chose class VII Because in class they agreed with the material That will be given ie material two-dimensional figure.

Analysis in study This uses pattern study quantitative descriptive for measure enhancement results from Study mathematics students through test formative Which done every time cycle And For measure enhancement liveliness. For the evaluation test results study, the score maximum ideally is 100 with a Criteria Minimum Completeness of 76. To calculate the percentage of learning completeness, use the following formula:

$$P = \frac{\sum Siswa \ yang \ tuntas \ belajar}{\sum Siswa} x100\%$$

Table 1
Learning Success Level Criteria

Level of success (%)	Information
$\geq 80\%$	Very high
60% - 79%	Tall
40% - 59%	Currently
20% - 39%	Low
<20%	Very low

Level student activity is measured using a Likert scale (1 to 5) with the condition that if more from or The same with 2.75 students are considered active (A) and when not enough from 2.75 considered inactive with a success target of 75%.

3. Results and Discussion

Result of study action class This is obtained from the result data test description and sheet observations given to each cycle test description given aim know enhancement results

Study mathematics students whereas results from sheet observation student aim know enhancement activity students during the learning process. Observation results are also used as a material reflection for repairing and improving classroom learning. Following This is a description and results of his learning. Based on data results test is carried out at the end of each cycle, and an analysis is carried out which aims to obtain a description achievement completeness Study. The level of learning completeness is presented in the following Table 2.

Table 2

Test Result Data Student

Information	Student Test Scores in Each Cycle		
	I	II	III
Average score for mathematics learning outcomes	64.5	73.5	79.6
Percentage of students who completed	16%	38%	81%

The learning completion presented in Table 2 shows that the average student test score in cycle I was 64.5. From this table, it can be seen that the students who completed their learning in the first action were 5 out of 32 students who took the test in cycle I. So, the percentage of students who completed their studies was 16%. In cycle II, the average student test score was 73.5 and the number of students who completed learning in cycle II was 12 students out of 30 who took the test in cycle II, so the percentage of learning completion was 38%. In cycle III, the average student test score was 79.6 and the number of students who completed learning in cycle III was 26 out of 31 who took the test in cycle III, so the percentage of learning completion was 81%.

Table 3

Activity Data Student

Information	Cycle		
	I	II	III
Liveliness Student	46.67 %	73.33 %	81.33 %

Based on the results of research and data analysis, the following results were found *Think Pair Share* type cooperative learning model in cycle I and starting with learning with the learning objective of determining the area and circumference of a circle has not seen an increase in student mathematics learning outcomes. Of the 32 students, only 5 students achieved learning mastery with a class average of 64.50 and a KKM of 76, with student activity of 46.67% of the target of 75%.

Think Pair Share type cooperative learning model in cycle II with the learning objective of determining the arc length of a circle through reflection and action has shown improvement and can improve students' mathematics learning outcomes, namely of 31 students, as many as 12 students have achieved learning completeness with an average of The class average was 73.47 with a KKM of 76, as well as student activity in learning which increased from cycle I, namely 73.33% of the target of 75%.

Figure 1

Activity student writing and presenting an answer

Think Pair Share type cooperative learning model in cycle III shows its effectiveness and it is true that the use of the Think Pair Share type cooperative learning model from cycle I to cycle III can increase students' activeness and mathematics learning outcomes regarding flat shapes.

Figure 2

Prospective Teacher Activities Helping Group Experiential Learning Difficulty

Activities for prospective mathematics teachers to help group study experienced students' difficulty is a very worthwhile effort to help students overcome difficulty in understanding material mathematics. Activity that is visible on:

(a) identification difficulty

Before starting session learning, prospective mathematics teachers will identify to difficulties faced by students. This can be done through observation class, evaluation results in tests or assignments, as well listen to complaints or questions from students.

(b) Organizing group study

Prospective mathematics teachers will organize groups consisting of learning from students who experience similar difficulties in understanding material mathematics. Group This will work as a supportive environment for students For each other to learn and support one another.

(c) Preparation plan learning

Based on the identification difficulties that have been carried out, prospective mathematics teachers will compile plan appropriate learning with the needs of each group. Plan This can cover repetition material, gift example questions, or use methods of different learning by style study student.

(d) Mentoring and guidance

During session group study, the prospective mathematics teacher will give assistance and guidance to the student. They will explain difficult concepts, provide examples, as well answer questions that arise from students.

(e) Reinforcement draft

Apart from helping the student understand difficult material, prospective mathematics teachers will also give exercises or purposeful activities to strengthen understanding of concepts that have been studied.

(f) Evaluation progress

After the session group study is finished, the prospective mathematics teacher will evaluate the progress student in understanding the material. This can be done through informal evaluations such as discussion groups or observations, as well as formal evaluations such as exams or tasks.
(g) Personal development
For prospective mathematics teachers, activities this is also a chance to develop skills and teach them alone. They can Study and adapt approach learning by need student as well as increase their ability they explain concepts of mathematics in a way clear and easily understood.

4. Conclusion

Classroom action research on class VII students of SMP Negeri 1 Indramayu was carried out in three cycles. Each cycle consists of four stages, namely: (1) planning, (2) implementing actions, (3) observing, and (4) reflecting. Based on the discussion and results of data processing during the research which includes data analysis to determine improvements in student mathematics learning outcomes and observation analysis to determine student activities, it can be concluded as follows (a) the use of the *think pair share type cooperative learning model* can increase student activity in learning; (b) the use of the *think pair share* type cooperative learning model can improve students' mathematics learning outcomes.

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