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Reforming Mathematic Through The Concept Of *Cooperative Learning* By Using The Technique Think-Pair-Share Focusing On Cube And Cuboid To Improve The Study Result And Activity Of Students From Banyubiru 1 State Middle School Class Of Viiie In Semarang District On Their Second Semester Year Of 2010/2011

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Abstract

Determining the use of mathematical model is very influential on students' study outcomes and activity. In deciding the mathematical model, teacher should consider students' characteristic, the material, and also the students' habits. So far, mathematics teacher of class VIII E SMP Negeri I Banyubiru Kabupaten Semarang tend to use the method of lecture and mechanistic structural because he feel that this is the easiest method for the students to digest. Furthermore, the teacher only uses props on materials that are considered hard. This style of teaching from the teacher has an impact on students. Students tend to be passive when lecture is in process resulting in less student activity and also minimum result on their study. This is proven by their average mark which is 60.51 and the limit to pass is 38.7%. Because of this, reforming mathematic through the concept of *cooperative learning* by using the technique think-pair-share is needed. This research of type"Penelitian Tindakan Kelas" (PTK) with 3 trialwhereas in trial 1, the average increases to 89,9 and the limit to pass is 96,77% and the student activity is 28,35%; for the second trial, the results are the average of 92,55 with the limit to pass 100% and the student activity is 41,38%; and for the last trial the results are the average of 96,29 with the limit to pass 100% and the student activity is 52,12%.

Key Words: *classroom action research, Cooperative Learning Tipe Think-Pair-Share, space cube and cuboid*.

I. INTRODUCTION

One of the teaching's competencies that should be mastered by teachers is the competency of pedagogic, which is the study of being a teacher or the process of teaching. The term generally refers to strategies of instruction, or a style of instruction. Determining the strategies of instruction is also one of this component of this competency. The model of mathematic instruction where mathematic is one of the courses that are a compulsory in the basic education, needs to be focused, and becomes the first requirement to achieve success in study. This is also supported by one of the most common comment that says mathematic is the hardest course for students to understand, so it is required that mathematics teacher must not choose strategies of instruction that is not efficient because this will result in bad grade on the students'

reports. This wrong strategy of instruction is being used in class VII E SMP Negeri I Banyubiru Kabupaten Semarang where the strategy that is being used is mechanic structural with lecture. Teacher will only use props when he feels that the material is considered hard to understand. This method of teaching also result in less students involvement and a one way learning which is just listening to teacher. Students are not engaged to learn the material because they're just listening to the teacher and watching him. This is proven by the fact that the less result that is being achieved compared to teachers that are active in learning, interacting with students, and using activities to learn. The result is an average of 60.51 which is bellow KKM and also the limit to pass which is 38.7%. This kind of mathematic teaching strategy needs to be reformed to increase the students' understanding in math. The solution that comes up is reforming the model by using study paradigm and student oriented teaching. One of the models of teaching of this type is the *Cooperative Learning* by using the technique *Think-Pair-Share*. This model of teaching uses discussion method where students pair up and then they will discuss plenary. This way, students are trained to express their thoughts and also to respect what others' thoughts are, not only focusing on the material that is being presented by the teacher. By using this technique, students will get involved and engaged in learning, and therefore they will be active in studying, in this case mainly on the 3-d object cube and cuboid. Based on the reasons above, we can conclude that the main purpose of this research is to improve the study result of the students focusing on cube and cuboid for students on class VIIIE SMP Negeri 1 Banyubiru Kabupaten Semarang on their second semester year of 2010/2011.

II. RESEARCH METHOD

The type of research done was "classroom action research" (PTK) with collaboration of researcher with the teacher from the corresponding subject. This PTK consists of three trials whereas each trials is made up from 4 chained procedures which are planning, action, observation, and reflection. A trial in PTK is considered successful if the result from the study of that trial has fulfilled the "kriteria ketuntasan minimal" (KKM) that was set from the school. If the trial hasn't achieved the KKM then there will be a retrial on the same trial, and if the trial has passed the KKM then there will be a retrial that is considered as a stabilization trial. The minimal KKM that has been set

for *think-pair-sharemodel*is 75%.

The subject in this research is the students from class VII E SMPN 1 Banyubiru which consist of 31, a unity of 17 boy students and 14 girl students. The data is based on written tests and observation. Written test in form of report are given to the students to check the result of their cognitive study and the observation is done to observe whether or not students are actively involved when lecture is in session. The procedures are shown below:

1. Planning

Trial 1

1) Trial 1 first meeting

Creating RPP that based on think-pair-share, with intention to introduce the concept of cube's characteristics which will increase their understanding, to make learning how to find the surface area of a cube easier.Researcher also made RPP for second trial and third trial, making a student involvement sheet and a sign-in sheet.

a. Arrange a study group questions and evaluation questions related to the given lesson which is given with the solutions.
b. Preparing props, such as: cube structures made from straws, and some 3-D models that have cube shape.
c. Preparing a feedback sheet for teacher and students to give critics and comment to the trial that is currently ongoing.

2) Trial 1 second meeting

In this trial, a revision to the "Rencana Pelaksanaan Pembelajaran" (RPP) which is based on think-pair-share has been done. By observing the first meeting, with the lesson of how to find the side of a cube, revisions are needed to be done. We also made RPP for the first meeting of trial 2.

a. Planning a study group questions that will be given to each group.
b. Preparing evaluation questions.
c. Preparing props, cube objects.
d. Preparing a feedback sheet for teacher and students to give critics and comment to the trial that is currently ongoing.

Trial 2

1) Trial 2 meeting 1

a. Creating "Rencana Pelaksanaan Pembelajaran" (RPP) based on think-pair-share, by understanding the characteristic of cuboid (sides, corners, diagonal sides, diagonal faces, and diagonal spaces). Other than that, researcher also created RPP for second meeting for trial 2 and trial 3, creating activity sheet and sign-in sheet.
b. Arrange a group worksheet and evaluation problems corresponding to the lesson with the solution to the questions.
c. Preparing props, objects that has form cuboid, and cuboid structure made from straws.
d. Preparing a feedback sheet for teacher and students to give critics and comment to the trial that has been performed.

2) Trial 2 meeting 2

a. In this trial, a revision to the "Rencana Pelaksanaan Pembelajaran" (RPP) which is based on think-pair-share has been done. By observing the first meeting of trial one, with the lesson of how to find the side of a cuboid, revisions are needed to be done. We also made RPP for the first meeting of trial 2.Planning group worksheets which are going to be distributed to each group.
b. Preparing evaluation questions.
c. Preparing props, objects that has form cuboid.
d. Preparing a feedback sheet for teacher and students to give critics and comment to the trial that has been performed.

Trial 3

1) Trial 3 first meeting

Creating "Rencana Pelaksanaan Pembelajaran" (RPP) which is based on think-pair-share. In this meeting we're going to teach the students on how to find the surface area of cube and cuboid. The revision that has been done in this trial is that for us to be more passionate when explaining the lesson.

a. Arrange a group worksheet and evaluation problems corresponding to the lesson with the solution to the questions.
b. Preparing props, structure of cube and cuboid.
c. Preparing a feedback sheet for teacher and students to give critics and comment to the trial that has been performed.

2) Trial 3 second meeting

In the second meeting we done evaluation for all the material that has been over from the previous trials.

2. Action

Procedures of think-pair-share in action PTK

a. Trial 1

We have done two actions in this trial. In the first action, we covered the characteristic of cube, and on the second action we covered sides of cube. Here is some explanation on trial 1.

First and second meeting of the first trial was about giving them questions because we haven't really explain the lesson that is going to be given to them, we assumed that the lesson is already explained to them from their previous class and is not that hard, because of that we just give them problems to refresh their memory. Then we continue by having a group discussion, all groups understand how to solve the problems because no group ask a question about our problems in this meeting, then we gave evaluation questions.

b. Trial 2

In this trial we had 2 meetings. We covered the characteristic of cuboid and also the sides of cuboid. The way we explained our lesson is by revising what we done in trial 1. The sequence goes by explaining the material then a group discussion and closed by an evaluation test.

c. Trial 3

We only had one meeting in this trial. In that one meeting, researcher explained how to find the surface area of cube and cuboid. The sequence goes, explaining the material, then a group discussion, and an individual evaluation test. All of the trial we done are based on think-pair-share.

3. Observation

1) Trial 1

a. Teacher (mathematics teacher) as an observer observing on how researchers work as a teacher in teaching the students by using a method based on think-pair-share.

b. Students as observer giving comment about how the study activity goes. We received any comment whether if its positive (things that need to be maintained), or negative (things that needs to be removed).

2) Trial 2

a. Teacher (mathematics teacher) as an observer observing on how researchers work as a teacher in teaching the students by using a method based on think-pair-share. In this research, all students look very enthusiastic when receiving our explanation.

b. Students as observer giving comment about how the study activity goes. We received any comment whether if its positive (things that need to be maintained), or negative (things that needs to be removed).

3) Trial 3

a. Teacher (mathematics teacher) as an observer observing on how researchers work as a teacher in teaching the students by using a method based on think-pair-share. In this research, all students look very enthusiastic when receiving our explanation.

b. Students as observer giving comment about how the study activity goes. We received any comment whether if its positive (things that need to be maintained), or negative (things that needs to be removed).

c. We gave quiz problems to observe students' if the students can keep up with our pace when explaining the lesson.

4. Reflection

1) Trial 1

We received the result of observation step, so we can analyze and evaluate them. From our observation, we feel that there is a need to revise our way of explaining, such as the volume of our voices, and that we don't feel comfortable when explaining our lesson to the students.

2) Trial 2

We received the result of observation step, so we can analyze and evaluate them. After we analyze and evaluate them, we reflected on them and think whether our revision was successful or not. The result of trial one are used to decide if any revisions are needed. The reflection that we had done was to be more passionate, be more confidence when in front of the classroom. We feel that we had an improvement at that time.

3) Trial 3

We feel that we're very successful on this meeting because it goes through our plan smoothly, the comments that we received prove that we had an improvement compared to the previous meeting.

III. RESULT

In trial 1, the teacher gives a problem and asks students to form discussion groups. Meeting on the first trial contains a provision to recall the problem of what they have learned and then followed by group discussions, all students in the group was less active in the group tasks, they are still difficult to exchange ideas and opinions. The students appear to be quiet in the group discussion, they don't divide tasks within the group efficiently as seen from the facts that only some students actively involved in doing the assignment while others only see others work and in advanced presentation of the group they are still shy and rely on other friends. Based on observations of trial 1 in Table 2 below it can be concluded that all students pay attention to teachers, the majority of students do not dare to express opinions, have not answer the questions of teachers, have not take part in discussions, and have not done a good job. It is proven from the percentage of students' activities that are approximately 25%. In trial 1, there is no student who dare to ask the teacher. When viewed from the average value of students, then the average value in trial 1 had increased when compared with the average value in pre- trial, that is increased to 89.80 from 60.51.

In trial 2, students have increased learning outcomes, both in tests and student activities. Students may respond in enthusiastic way in presenting the results of their findings in front of the class and other students give opinions on these findings, for example, in finding the nets-nets and beam cube with each other students who have different findings. Based on observation, all students pay attention to teachers, the majority of the students dare to express an opinion, answer the questions of teachers, take part in discussions, and perform the task well and the courage to ask the teacher has increased compared to trial 1. For the average student in trial 2 had increased compared to the average value on a pre trial, trial 1 and trial 2, namely from 60.51 and 89.80 to 92.55. In the third trial in this meeting the researchers taught the topic to find the surface area of cubes and blocks. The flow of this study include the delivery of content followed by

group discussions, job evaluation tests and evaluation tests are completed independently / individual. In this stage, the students achieve increase in both the assessment of written tests and assessment of their activeness from the previous trials. Students are able to maximally divide the task group and all come to think, in the presentation most students in the group took turns and there are also students from other groups responded to the presentation, which proves that this trial is able to improve learning outcomes, and student activity in learning. Average value in trial 3 was 96.29, it is higher than the mean value of pre trials, trial 1 and trial 2. For comparison of test results on the pre-trial, trial 1, trial 2 and trial 3 can be seen in the table below.

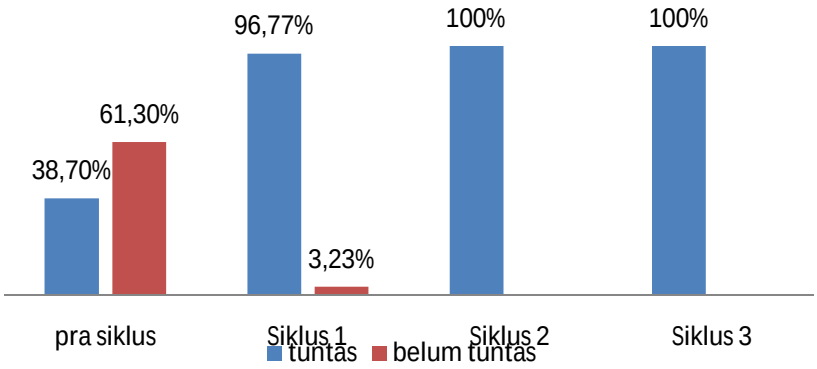
Table 1 Comparison of results between the Mathematics Learning trial

No	Description	Pre trial	trial 1	trial 2	trial 3
1	Completed	12 students 38,7%	30 students 96.77%	31 students 100%	31 students 100%
2	Not Completed	19 student 61,3%	1 student 2,23%	-	-
3	Maximum Value	79	97	100	100
4	Minimum Value	47	55	67	85
5	Average Value	60,51	89,80	92,55	96,29

Based on Table 1 above it can be seen that the completeness limit students' learning in pre- trial has not reached the minimum specified limit, which is 75%, where the percentage of new students learning result only reached 38.7%. Furthermore, the pre-trial average value is still below the value determined at 65 KKM, which is only 60.51. This condition is corrected by changing the learning model used by the teacher, the learning model with a mechanistic approach, the learning model using learning paradigms, namely cooperative learning model SMT type (type of Cooperative Learning Think-Pair-Share). This learning model requires students to discuss in pairs which is then followed by a plenary discussion. This learning model is aimed to train students to be active in learning, respect the opinions of others, dare to express opinions also ask if they have difficulty, and develop student creativity. Once given this learning in a trial consisting of 2 meetings and the material of the elements of the cube, then the students are given an evaluation of learning. The results of our evaluation of this learning in trial 1 is that many students who scored above the KKM, namely 30 students completed the study and one student classified as unresolved. Average value that can be achieved by students is as much as 89.90. Although the completeness limit and the

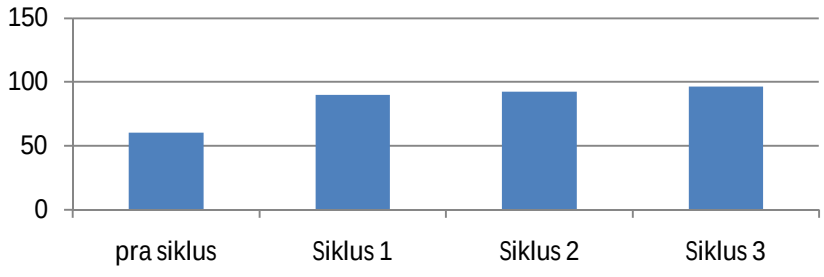
average student studying at one of this trial has reached the threshold, the learning is undertaken in trial 2 as a consolidation trial. In trial 2, students are encouraged to understand and master the material before the elements of the cube and added new material that is, nets cube, beam elements and beam webs. In trial 2, 100% or 31 students completed their study, meaning that 31 students scored above the KKM, where the minimum is 67 and the highest value is 100. To complement and complete the material, then we held Cycle 3 where in this trial, students learn about the surface area of cubes and blocks. Mathematics learning outcomes of students in this trial reaches 100% completeness limit and the average value of 96.29 where the value is close to a perfect score, namely 100, and the minimum value is 85. To clarify the increase of student learning completeness and to prove the value of the average math student learning outcomes we provide the diagram below:

Chart 1: Comparison of Student Learning completeness limit inter- trial



While the chart comparing average values between trials can be seen in Chart 2 below:

Diagram 2 ratio value of the average inter- trial



Based on Diagram 1 and Diagram 2 above it can be concluded that the completeness limit of learning and students 'mathematics learning outcomes for trial 1, trial 2 and trial 3 has a higher value and percentage than the completeness limit of learning and

students' mathematics learning outcomes for pre- trial. In other words, there is increased between the pre- trial into a trial of 58.07%, between the pre- trial to trial 2 and trial 3 of 61.30%. For trial 2 and trial 3, there are no students who scored below the value of KKM. In addition, when compared between trial 1, trial 2 and trial 3, the third trial is increased. The increase between trial 1 and trial 2 and 3 at 3.23% while between trial 2 and 3 there is no increase to the completeness limit. For the average value between trial 1 and trial 2 increased by 2.75 points and the trial 3 increased by 6.49 points. For the average value between trial 2 and trial 3 had an increase of 3.74 points.

In addition to the percentage of students' learning as well as the completeness limit of the average value which is the learning outcomes of students who experienced an increase, other things that have increased for trial 1, trial 2 and trial 3 is the activeness of the students during the learning takes place.

Table 2 Comparison of activity between trial Students

	trial 1	**trial 2**	**trial 3**
observation assessment			
a. Students pay attention to teacher	100 %	100 %	100 %
b. Being able to express opinions	12.1 %	22.6 %	32.2 %
c. Able to answer teacher's questions (activeness)	16.1 %	32.2 %	41.9 %
d. Dare to ask the teacher	-	9.7 %	16.1 %
e. Take part in discussions	32.2 %	41.9 %	41.9 %
f. Conduct a well done job	9.7 %	41.9 %	80.6 %

Conditions of pre- trial to trial 1, trial 2 and trial 3 proves that the model of cooperative learning which is a type of TPS that aimed to improve the learning has proven to be successful in increasing the learning of mathematics

IV. RESULTS AND DISCUSSION

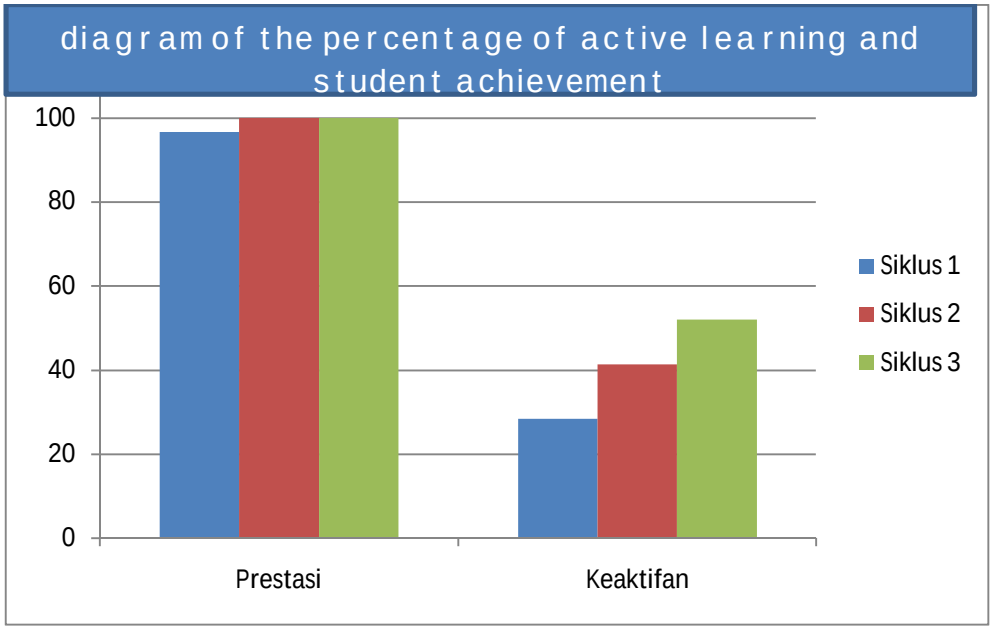
Teaching model based on co-operative type of think-pair-share is proven to be able to improve students' study result and this is shown in table 1, which is in pretrial, there was 12 students or 38.7% that didn't pass with average of 60.51. After they received co-operative type of think-pair-share, the percentage of the passing students has improved to 58.07%, compared to the first trial, and 61.30%, compared to trial 2 and trial 3. The

average mark received increase from 60.51, to 89.90 in trial 1, and 92.55 on trial 2, and finally 96.29 on trial 3. Other than the improved mark and percentage of passing, students also improve their activity. In example, in trial 3, the percentage is higher compared to their activity in trial 1 and trial 2. In trial 1, students undergo adaptation in learning the new model where students are still not completely used to doing activity. Almost around 25% of the students are active, and the rest are not active yet, and there are also some students that are scared to ask question to teacher. In trial 2, students are improving in their activeness in class, where almost 40% students are more active now, and almost 9.7% of the students in class are brave enough to ask questions to the teacher. In trial 3 the percentage of students who are active in class are improving, and we found that 16.1% of the students are now brave enough to ask questions to the teacher. Moreover, students can also divide their group work optimally where everyone are participating in thinking on how to solve the problem. When it is time to do presentation, each group can present their work and other group who were listening also participated by asking questions and sharing their thoughts. This has proven that in this trial, their study result and their participation in class are improving.

V. CONCLUSION

From our research and observation that has been done in each trial, we conclude that:

a. Teaching model based on co-operative type of think-pair-share can improve study result of students when studying cube and cuboid.
b. Teaching model based on co-operative type of think-pair-share can engage students to participate in group work where students will improve their ability to communicate and work together. By doing this, the classroom will be more lively and they will have more passion in their study because there is interaction between teacher and students, and student with another student.



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