Fostering the Learning Achievement of Students of XI IPA4 at SMAN 3 Jember in Even Semester by Using the Cooperative Method of TGT Model on Functional Limit Material in 2018/2019 Academic Year

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ABSTRACT
Mathematics refers to the material which has abstract object and is built on deductive reasoning processes, covering the truth of a concept obtained as a logical consequence of previous accepted truths. To be easily understood by students, deductive reasoning processes on mathematics learning is used to strengthen the understanding that students already have. The purpose of learning mathematics is to train how to think systematically, logically, critically, creatively and consistently. This research was based on the several problems: (a) What is the improvement of students’ learning achievement by implementing TGT cooperative learning method? (b) What is the effect of TGT cooperative learning method on students’ learning motivation? While the objectives of this study were: (a) Finding out the increase on students’ learning achievement after the implementation of TGT cooperative learning method. (b) Knowing the effect of students’ learning motivation after TGT model of cooperative learning was applied. This research used action research as many as three cycles. Each cycle consisted of four stages, they were: design, activity and observation, reflection, and refining. The targets of this research were the students of class XI IPA4 at SMAN 3 Jember. The data obtained were in the form of formative test results, observation sheets of teaching and learning activities. It can be concluded that TGT model cooperative method had positive effect on the students’ learning motivation in understanding the material concept of opportunities so that they were able to achieve maximum learning achievement and this learning model is also capable to be used as an alternative mathematics learning so that the teachers can convey mathematical material concepts and absorbed by the students more effectively.

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INTRODUCTION
Mathematics is a field of study concerning abstract objects and is built on the process of deductive reasoning by finding the truth of a concept as a logical consequence of the truth of the previous concepts that have been accepted so that the interrelationships between concepts in mathematics are very strong and clear.

Learning mathematics is difficult to understand by students so that the deductive reasoning process is needed to strengthen the understanding already possessed by students. Therefore, the purpose of mathematics learning is to train ways of thinking systematically, logically, critically, creatively and consistently.

In mathematics learning, there will no longer prioritizes absorption through the achievement of information, but prioritizes capacity building and information processing so that the activities of students need to be improved through exercises or mathematical tasks by working in small groups and explaining ideas to others. (Hartoyo, 2000: 24). Active participation from students and learning methods that involve students directly in learning are needed. The method in question is a cooperative learning method. Cooperative learning is a teaching that involves students working in groups to set common goals. Felder, (1994: 2).

Cooperative learning emphasizes more interaction between the students and others must make active communication with their fellow students so that through this communication the students are expected to master the subject matter easily. They will be easier to understand the explanation from their friends than the teacher’s explanation because their level of knowledge and thinking are more in line and commensurate. (Sulaiman in Wahyuni 2001: 2) points out that cooperative learning has a very positive impact on students who have low learning outcomes (Nur, 1996: 2).

Based on the above explanation, the researcher wants to try to do classroom action research entitled “Foster in the Learning Achievement of Students XI IPA 4 by using TGT (Team Games Tournament) Cooperative Learning Method in the 2018/2019 Academic Year on limit functional material.”

The main idea behind TGT model is to motivate the students, to encourage and help them in understanding and mastering the concept by mastering exercises and skill presented by the teacher. If the students want their group to get award they have to help their friend within the group to learn the given material. They have to encourage their friend to do their best and state a norm that learning is fun.

The terms that should be understood under the title of this research are as follow:

1. Cooperative learning method is a learning method which involves the students to work together in group to decide common goals (Fleder, 1994:2).
2. Learning motivation is a psychic momentum within individual to be able to do learning activity and add skill, experience. The motivation encourages and guides learning interest to reach goals.
3. Learning achievement is a learning result stated in the form of grade or score, after the students attend mathematics class.

Because of the limitation in time, the scopes of this research are:

1. This research was conducted to the XI grade students of Science 4 in the even semester on the material of function limit in 2018/2019 academic year.
2. This research was conducted in January-February in the even semester 2018/2019 academic year.
3. The material delivered was Aljabar function limit.
Based on the research background above, the research problems can be formulated as follow:

1. How is the students learning achievement after the implementation of cooperative learning model TGT in the XI grade students of Science 4 in the 2018/2019 academic year?
2. How is the effect of cooperative learning model TGT toward the students’ learning motivation on the XI grade students of Science 4 in the 2018/2019 academic year?

Based on the problems above, this research was intended to:

1. Know the students learning achievement after the implementation of cooperative learning model TGT on the XI grade students of Science 4 in the even semester in the 2018/2019 academic year.
2. Know the effect of the students learning motivation after the implementation of cooperative learning model TGT on the XI grade students of Science 4 in the even semester in the 2018/2019 academic year.

This research contributes to the following people:

1. The school in the attempt to improve the students’ learning achievement especially on the understanding of mathematics concept.
2. The teacher as the consideration in deciding the appropriate method and learning which is beneficial for the students.
3. The students who can improve their learning motivation on mathematics and practice their social behavior to care about other students’ success in reaching the learning goals.

**METHODOLOGY**

This research was a classroom action research because it was conducted to solve the problem within the classroom. This research also a qualitative descriptive because it represented how a learning technique can be implemented and how expected result could be reached.

In this action research, the teacher’s role was the researcher so that she was responsible to this research. The main objective of this research was to improve the classroom learning achievement in which the teacher involved completely in terms of planning, acting, observing, and reflecting.

The researcher did not work with anyone in this research, the researcher as the primary teacher in the classroom and it was done as usual, therefore, the students did not know that they were observed. By doing this, it was expected that the data obtained from the research was as objective as possible in order to fulfill the needed validity.

The place where the research was conducted to obtain the data was SMAN 3 Jember especially in the XI grade of Science 4. This research was carried out in January-February in the even semester with the material of Aljabar function limit in the 2018/2019 academic year.

This research used classroom action research. According to The PGSM Project Trainer Team, Classroom action research is a form of reflective study by the researcher which is used to improve the rational mastery of their action in doing task, mastering concept towards their action, and improving the condition where the learning practice is conducted (in Mukhlis, 2000:3).
The main objective of classroom action research is to fix/improve the learning practice simultaneously, while the following objective is growing research culture among the teachers (Mukhlis, 2000:5).

Based on the type of the chosen research, namely action research, this research used action research model by Kemmis and Taggart (in Sugiarti, 1997:6), that is spiral cycle from one to another. Each cycle covers planning, action, observation, and reflection. The steps in the next cycle are revised planning, action, observation, and reflection.

Initial action in the form of problem identification was done before stepping into cycle 1. The spiral cycle of classroom action research steps can be seen as follows:

Figure 3.1 The Flow of CAR

The explanations of the flow above are:
1. Initial plan/design, before conducting research, the researcher formulates the problem, objective and make an action plan, including research instruments and learning devices.
2. Activities and observation, including the action taken by the researcher as an effort to build the students’ understanding of the concept and observe the results or effects of the application of team games tournament learning method.
3. Reflection, the researcher examines, looks at and considers the results or effects of the action taken based on the observation sheet filled by the observer.
4. The revised plan/design, based on the results of reflection from the observer, make a revised draft to be carried out in the next cycle.

The observations were divided into three rounds, which were rounds 1, 2 and 3, where in each round was implemented the same treatment (same activity flow) and
discussed one sub-topic which ended with a formative test at the end of each round. It was made in three rounds intended to improve the teaching system that had been implemented. The instruments used in this research consisted of syllabus, LP, student worksheets, workshops for KBM (Teaching and Learning Activities) observation and objective formative test of 46 questions that had been tested with test validation steps, reliability, level of difficulty and comparability (Suharsimi Arikunto, 2001).

The data needed in this research were obtained through observation of the processing of TGT cooperative learning method, observation of students and teacher activities, student motivation questionnaire, and formative tests.

To find out the effectiveness of a method in learning activities, data analysis needs to be conducted. This research used descriptive qualitative analysis technique, which is a research method that describes reality or facts in accordance with the data obtained in order to determine the learning achievements achieved by the students and also to obtain the students’ responses toward the learning activities and the students’ activities during the learning process.

To analyze the students’ success rate or success percentage after the teaching and learning process in each round was done by giving an evaluation in the form of written test at the end of each round. This analysis was calculated using simple statistics, which are:

1. To assess the test or formative test

   The researcher sums up the values obtained by students, which are then divided by the number of students in the class so that the average formative test can be formulated:

   \[ \bar{X} = \frac{\sum X}{\sum N} \]

   With : \[ \bar{X} \] = Average value
   \[ \sum X \] = Total of all students’ values
   \[ \sum N \] = The number of students

2. For learning completeness

   There are two categories of learning completeness, namely individually and classically. Based on the instructions for implementing teaching and learning, which is a student has completed the learning if he has achieved a score of 76% or a score of 76, and the class is indicated as complete learning if in that class there are 85% who have achieved absorption of more than or equal to 76%. To calculate the percentage of learning completeness, the following formula was used:

   \[ P = \frac{\sum \text{Siswa yang tuntas belajar}}{\sum \text{Siswa}} \times 100\% \]

RESULT AND DISCUSSION

The research data obtained were in the form of the results of testing items, observation data in the form of observations of management of TGT model cooperative learning method and observation of students and teacher’s activities at the end of learning, and formative test data of students in each cycle.

The data from the results of testing items were used to get a test that truly represented what was desired. This data were then analyzed for the level of validity,
reliability, level of difficulty, and differentiation. The observation sheet data were taken from two observations, namely observation data of the cooperative learning method of the TGT model which was used to determine the effect of the application of the TGT cooperative learning method in improving the students’ learning achievement and observation data on students and teacher’s activities.

Formative test data to determine the increase in students’ learning achievement after the TGT model cooperative learning method was applied.

Before conducting data retrieval through the research instruments in the form of a test and getting a good test, the test data were tested and analyzed. The trial was conducted on students outside the research target. Analysis of the tests done includes:

1. Validity
   The validity of the questions is intended to determine the feasibility of the test so that it can be used as an instrument in this research. From the calculation of 45 questions, 15 invalid questions and 30 valid questions were obtained. The results of the validity of the questions are summarized in the table below.

<table>
<thead>
<tr>
<th>Valid</th>
<th>Invalid</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3, 4, 7, 9, 10, 11, 12, 13, 14, 17, 19, 21, 23, 25, 26, 27, 28, 29, 30, 36, 37, 38, 39, 41, 42, 43, 44, 45</td>
<td>5, 6, 8, 15, 16, 18, 20, 22, 24, 31, 32, 33, 34, 35, 40</td>
</tr>
</tbody>
</table>

2. Reliability
   The questions that have met the validity requirements are tested for its reliability. From the calculation results obtained the reliability coefficient r11 was 0.667. This price was greater than the price of the product moment. For the number of students (N = 35) with r (95%) = 0.381. Thus the test questions used had met the reliability requirements.

3. Difficulty Level (P)
   Difficulty level is used to determine the level of difficulty of the question. The results of the analysis showed that from the 46 questions tested there were 21 easy questions, 14 medium and 10 difficult questions.

4. Distinguishing Power
   Distinguishing power analysis is done to determine the ability of the problem in distinguishing the high-ability students with low-ability students. The results of the distinguishing power analysis were obtained by the question that had numbers of 16 bad questions, 21 medium questions, and 8 good questions. Thus the test questions used had fulfilled the requirements for validity, reliability, difficulty level, and distinguishing power.

   From the first cycle, it was explained that by applying the TGT model cooperative learning method, the obtained average value of students' learning achievement was 77.14 and learning completeness reached 77.14% or there were 27 students from 35 students who had completed the learning. The results showed that in the first cycle classically, the students had not passed the learning because they got the score of ≥ 76 only as much as 77.14% lower than the passing percentage wanted that was 85%. It was because the students felt it was new and did not understand what was intended and used by the teacher by implementing the cooperative learning method of TGT model. The teaching and learning process in the cycle I had weaknesses so that it needed revisions to be done in the next cycle.
1) The teacher needed to be more skilled in motivating the students and clear in explaining the learning objectives in which the students were asked to be involved directly in every activity to be done.

2) The teacher needed to distribute time efficiently by adding information needed and gave notes.

3) The teacher should be more skilled and enthusiastic in motivating the students so that they will be more enthusiastic.

   From the cycle II, it obtained the mean score of the students’ achievement was 82.86 and the learning completeness reached 82.86% or as many as 29 students of 35 students had passed the learning. This results revealed that in the cycle II the learning completeness classically increased little bit better than in the cycle I. The increase of students’ learning outcomes happened after the teacher informed that at the end of each lesson, test was always be held so that in the next meeting, the students were more motivated to learn. Besides, they also had understood what was intended and wanted by the teacher by implementing the cooperative learning method of TGT model.

   The implementation of learning activities in the cycle II had weaknesses. Therefore, it needed revisions to be done in the cycle II, as follows:

   1) The teacher in motivating the students should make them to be motivated during the process of teaching and learning.

   2) The teacher should be closer to the students so that there was no afraid feeling in students to express their opinions or asks.

   3) The teacher should be more patient in guiding the students in drawing the conclusion/expressing the concept.

   4) The teacher should distribute time efficiently so that the learning run as expected.

   5) The teacher should add more example of questions and gave exercises to the students to be done in each teaching and learning activity.

   Based on the results of cycle III above, it obtained the mean score of formative test was 85.71, from 35 students, there were 30 students who had passed and 5 students had not reached the learning completeness. Therefore, classically, the learning completeness reached was 85.71% (belonged to passed-category). The results of cycle III had increased better than cycle II. The increase result in the cycle III was influenced by the existence of the teacher’s skills in implementing the cooperative learning method of TGT model so that the students were more used to this learning and they were easier in understanding the material given.

   In this stage was examined what had been done well and not well in the teaching and learning process by implementing the cooperative learning of TGT model. From the data obtained, it can be explained, as follows:

   The Completeness of the Students’ Learning Outcomes

   Through the results of this research showed that the cooperative learning method of TGT model had a positive impact in increasing the students’ learning achievement. This can be seen from increasingly steady understanding of the students toward the material given by the teacher (the learning completeness increased from the cycles I, II and III) that were 77.14%, 82.86% and 85.71%. In the cycle III, the students’ learning completeness was classically reached.

   The Teacher’s Skills in Managing the Learning

   Based on the data analysis, it obtained the students’ activities in the process of cooperative learning of TGT model in every cycle had increased. This gave a positive
influence on the students’ learning achievement that was showed by the increase of the
students’ mean score in every cycle that constantly increased.

The Teacher and Students’ Activities in the Learning
Based on the data analysis, it obtained the students’ activity in the learning process on
limit function material with cooperative learning method of TGT model that was very
dominant was working by using tools/media, listening, paying attention to the teacher’s
explanation and discussion between students with teacher. Thus, it can be said that the
students’ activity can be categorized as active.

Whereas, for the teacher’s activity during the learning had conducted the steps of
cooperative learning of TGT model well. This can be seen from the teacher’s activities
emerged between the activity of guiding and observing the students in doing
LKS/finding the concept, explaining the difficult material, giving feedback/evaluation/question and answer in which the percentage of the activities above
were quite high.

CONCLUSION
From the results of learning activities that had been done through three cycles and based
on the discussion as well the analysis that had been done, it can be concluded, as
follows:

1. The cooperative learning of TGT model had a positive impact in increasing the
students’ learning achievement in understanding the concept of limit algebraic
function that was considered as difficult by the students indicated by the increase of
the students’ learning completeness in each cycle that were in the cycle I (77.14%),
cycle II (82.86%) and cycle III (85.71%).

2. The implementation of cooperative learning of TGT model had a positive influence
that was increasing the students’ learning motivation showed by the results of
interview with some students, the average answers stated that the students were
interested in cooperative learning of TGT model so that they were motivated to
learn.

From the results of the research obtained from the previous discussion, to make the
teaching and learning process of mathematics to be more effective and gave optimal
results for the students, therefore it was given several suggestions to implement the
cooperative learning of TGT model, it needs well preparation so that the teacher must
be able to determine or choose the topic that really can be implemented in the
cooperative learning method of TGT model in the teaching and learning process so that
the optimal result can be obtained and it is necessary to do a further research by using
this method to reach the better result.

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