

Improvement of Student Learning Result by Using Cooperative Learning Model of Teams Games Tournament Type on Algebra Fuction Limit (Case Study at Pagaran North Tapanuli North Sumatera Province Indonesia)

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Abstract—Among many reinforcement learning methods, cooperative model of Teams Games Tournament (TGT) appropriate in the material of limit fuction. Determinating the improvement of student learning result by using cooperative model of TGT type in the Grade Science of State Senior High School of Pagaran. The type of research is classroom action research. The subject of study is grade student of 2nd science totalling 36 students. From the initial test analysis, the students learning result of grade 2nd science are low. With the average 59.67, pre-test increased in 1st cycle to 74.67 and 2nd cycle increased to 85.14. Avarage increase of learning result from pre-test to 1st cycle is as much as 15.00 and 2nd on avarage learning result of 10.47. In the 1st cycle, students who completed from 17 students (42.22%) increased to 24 students (66.67%). In the 2nd cycle increased to 33 students and reached the predetermined indicator. From the data analysis concluded that using of cooperative learning model of TGT type can improve students mathematics learning result in the Grade Science Of State Senior High School of Pagaran.

Keywords—Learning Result, Teams Games Tournament (TGT), the Limit of Algebra.

I. INTRODUCTION

Mathematics is a structured science and its way of thinking uses abstraction, idealization and generalization for problem solving. Cornelius in Abdurahhman (2009) reveals five reasons for the need to learn mathematics: "Mathematics is; (1) means of clear and logical thinking, (2) means of solving problems of everyday life, (3) means of relationship patterns and generalization of experiences, (4) means of

developing creativity, (5) means of raising awareness of cultural development "[1].

Haspandi (2009) in Dewi Julita shows several factors that cause low student learning interest, that is: "(a) the number of mathematical materials or concepts to be studied, (b) the number of terms in mathematics that must be known and remembered, (c) lesson activities attract attention, (d) learning is more focused on the teacher as an informant, mathematics involving students, and (e) applied teaching model aroused students' interest to enjoy mathematics "[2].

Teachers should be able to adjust the teaching materials with learning methods in accordance with the topic so that students can achieve maximum learning achievement as proposed by Dian Armanto in Irwan Gunawan that: "The results of some mathematics education experts show that teachers are not able to use various variations of learning models, are reluctant to change the model of learning that is already considered true and effective not pay attention to the logical, critical, and creative mindset in learning mathematics." [3]

In mathematics not all subjects can use the same learning model, therefore an educator must be able to choose an appropriate learning method. Especially in the subject of limits of algebraic functions, there are many application formulas that require more practice questions. Besides, sometimes students have difficulty in using the formula and do not dare to ask the teacher. Therefore, as an alternative choice in teaching the subject of limit algebra function can be used cooperative learning model type TGT. In this model the

student's active role is needed. Students who do not understand can learn from students who have understood in small groups. Student knowledge will increase with the game/tournament during the learning process and supported some literature among others such as:

- Elsa Nopita Sitorus (2017) say that from the data analysis and hypothesis testing then as the CONCLUSION in this research is "There is influence of cooperative learning model type Teams Games Tournament (TGT) to the creativity of learning mathematics [4].
- Abdus Salam (2015) that the TGT experimental group students had achieved a significant learning outcome than the lecture based control group students. Attitude toward mathematics differed to a certain positive extent in the TGT experimental group. Based on these findings, some recommendations were made to overcome barriers to integrating web-based game playing into the classroom [5].

Based on this phenomenon and literature review, to answer the problems that exist then this problem is important to be examined through Class Action Research with the title: "Improvement of Student Learning Result by Using Cooperative Learning Model of Team Games Tournament (TGT) Type on Algebra Fuction Limit Material In the Grade Science of Senior High School.

II. METHODOLOGY

The type of research used in this study is a classroom action research or also called classroom action research. According to Russefendi (1999) reveals that: "Classroom research is a purposeful, thoughtful, careful, and attentive action undertaken by educational practitioners (teachers) on issues that exist in the classroom aimed at improving education such as teaching methods, curriculum, and forth "[6].

Classroom action research is known for the implementation cycle in the form of patterns: planning, implementation, observation, reflection and revision (re-planning) in the next cycle to achieve the desired target. The research approach used in this study is a qualitative approach and quantitative approach. Quantitative approach is used to process data learning outcomes, while qualitative approaches used to process data interviews and observation results of learning implementation.

The variables of research are; student learning outcomes. Learning outcomes are the results of efforts achieved by a person through the act of learning in the form of ability shown cooperative model TGT is a learning model consisting of 5 stages, namely class prentation, group learning (teams), games, tournaments, and team recognition. In this type of TGT cooperative learning teachers form groups of 4-6 heterogeneous students who can work together and help each other in solving mathematical problems.

A. Research Procedure

In Julita (2010) the research uses John Elliot's model research procedure which can be described as follows Figure 1 such as [2]:

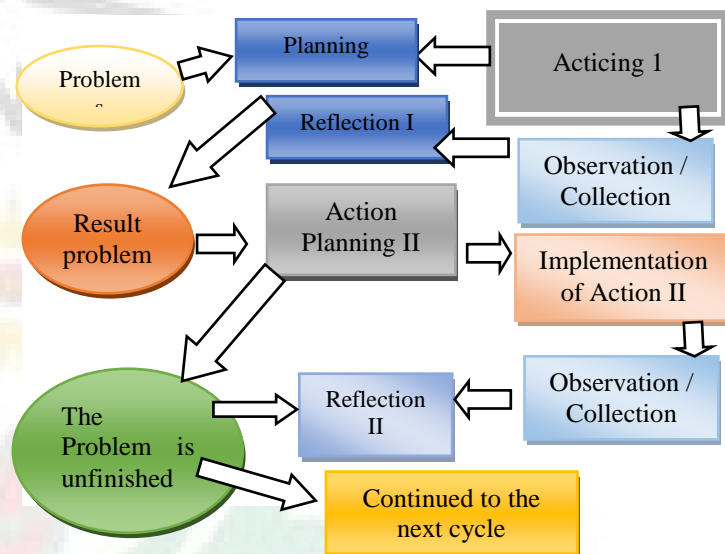


Figure 1. John Elliot's Model Research

The research procedure includes the implementation of classroom action research prepared by Carr and Kemmis (in Julita (2010) basically the Classroom Action Research consists of four interrelated and continuous basic stages: (1) planning (planning), (2) execution (acting), (3) observation (observing), (4) reflection (evaluation). This stage continues to repeat the cycle in accordance with the continuing problems to be solved. The cycle is essentially a series of "action-research-action-research" that is not in the research. If the problem can not be resolved, then the research continues to cycle II and beyond [2].

B. Data Analysis Technique

In this study data analysis is implemented in several stages namely:

- Data Reduction

The process of data reduction is done by selecting, simplifying and transforming data that has been presented in the form of field note transcripts. Aims to look at the student's mistake in resolving the test questions given and to find what action will be taken to correct the student's mistakes.

- Analysis of Data Presentation of Learning Outcomes

The researcher analysed the data of students' learning result by deskristif which aimed to describe the learning mastery. What needs to be analyzed to describe the learning mastery is the final test. A student is said to be

thorough in learning if the student has got a score of 65 and a class is said to be complete in learning if the class is 85% reaching completeness in learning.

- Effectiveness of Learning that TGT cooperative learning is successfully and effectively used in the material of algebra function limit if it meets the following criteria:
 - a. Students have mastered the mastery of the subject matter if it has fulfilled the Presentation of Results Assessment $\geq 65\%$ and Percentage of Classical Mastery $\geq 85\%$.
 - b. The implementation of learning goes well can be seen from the observation.

III. RESULT

Student learning outcomes can be seen from the Pre-test, Post-test in the first cycle and the Post-test on the second cycle in the Table 1.

Table 1. Results of Student Learning

Value	Data Learning Result			Information
	Pre-Test	Value	Post -Test Cycle II	
90	7 people	10 people	24 people	Rising
100	5 people	11 people	4 people	
80 - 89	4 people	2 people	5 people	
65 - 79	7 people	6 people	3 people	
55 - 64	13	7 people		
0 - 54	people			
Amount	36 people	36 people	36 people	
Average	59,67	74,67	85,14	Rising

The results of Pre-test before action I obtained an average of 59.67 where the average absorption rate of students is below the criteria of classical completeness (85%) and individual. From the level of mastery individually there are 17 people completed from 36 students. Students who do not complete as many as 19 students. On average of the Pre-test results there are students who complete the classical study with the percentage of 47.22% and students are not completely classical with the percentage of 52.78% and the average grade 59.67.

It is concluded that students have not succeeded either individually or as a whole (classical). As for the result of student learning test (Post-test I) from 36 students there are 24 students thoroughly individually (≥ 65) with percentage 66.67%. While 12 students of 36 students have not completed with the percentage of 33.33% and the classical does not meet the classical completeness with the average grade reached 74.67. Based on the analysis of data cycle I obtained the conclusion that the use of cooperative learning model type TGT in the learning that has been done has increased student

learning outcomes on the material limit algebra functions in classical but not yet complete mastery both in classical and individual does not meet the criteria mask 85% & ≥ 65 , so the need for improvement and development of learning by using cooperative learning model TGT type by giving action on cycle II.

After an improvement on cycle II, the average score of the students' learning achievement reaches the classical meaning that the class is complete and there are 33 students from 36 students, each with a 91.67% individual percentage. While unfinished individually as many as 3 students with percentage of 8.33%.

When compared to data from Pre-test with Post-test in cycle I and Post-test in Cycle II with average score of 59.67 on Pre-test and on cycle I mean Post-test is 74.67 and the average value in cycle II reaches 85.14. From the average value can be seen from the increase of Pre-test to cycle I of 15.00 then from cycle I to cycle II increased by 10.47. Students who complete in learning from 17 students with 47.22% percentage increased to 24 students with a percentage of 66.67% in cycle I and cycle II increased to 33 students with percentage of 91.67%, while students who are not complete reduced from 19 students on Pre-test to 12 students in cycle I and on cycle II reduced to 3 students.

By looking at the results of Pre-test, Post-test in cycle I and Post-test in cycle II concluded that the use of cooperative learning model type TGT on algebra function limit material can improve mathematics learning outcomes of students of) in 2nd science class in the Grade Science of 1st State Senior High School of Pagaran. For more details about improving student learning outcomes of Pre-test, Post-test I and Post-test II can be seen in Figure 2 about Student's Student Outcomes in 2nd science class in the Grade Science of 1st State Senior High School of Pagaran. From Pre-test, Post-Test Cycle I & Post-test Cycle II.

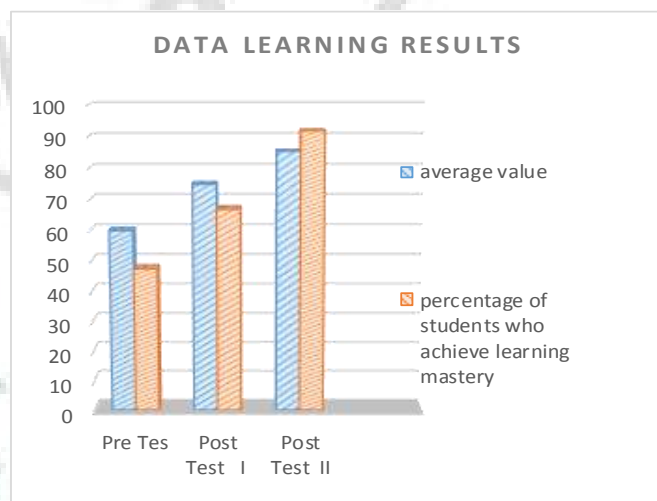


Figure 2. Comparison of pretest and posttest

Based on the results of interviews with some students who have not completed classically (<65) presented in appendix 35 that learning difficulties tend to occur due to class

atmosphere and less conducive discussion, it is difficult to determine the factorization of an algebraic function. After the learning process is improved in cycle II no students find it difficult to find the algebraic function limit value, besides there are some students who do not repeat the lesson at home so that the test result of the learning result is low. Based on this effort the researcher in overcoming student's learning difficulties with cooperative learning model type TGT observed from result of interview with student and from test result of student learning result showed good result.

Learning process using cooperative learning model type TGT is also getting better from cycle I to cycle II. Viewed from the observation of learning process has increased from the average value of 1.625 in cycle I increased to 2.725 in cycle II. From the discussion of the above observation results can be concluded that there is an increase in learning outcomes and effective use in 2nd science class in the Grade Science of 1st State Senior High School of Pagaran using cooperative learning model type TGT in material limit algebra function.

IV. CONCLUSION

Based on the discussion of the research results obtained conclusion as follows:

1. Application of learning model type TGT can improve student learning outcomes of grade in the Grade Science

of 1st State Senior High School of Pagaran in learning material limit algebra function.

2. Learning process using cooperative learning model type TGT also better from cycle I to cycle II.

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