THE IMPLEMENTATION OF THE SCIENTIFIC APPROACH WITH COOPERATIVE LEARNING STRATEGIES TEAMS GAMES TOURNAMENT (TGT) TYPE TO IMPROVE STUDENT CRITICAL THINKING ABILITY

(CAR In Grade XI IPA 1 SMA 8 Surakarta Academic Year 2013/2014)

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In Grade XI IPA 1 SMA 8 Surakarta Academic Year 2013/2014)

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ABSTRACT

This research aims to know the improving of students critical thinking ability through scientific approach with cooperative learning strategies TGT type. The type of research is class action research. Subjects of this research are teachers who give class action and action receiver is students of XI IPA 1 SMA 8 Surakarta with the number 25 students. Data collection method used are the observation, field notes, documentation and tests. The data analyzed technique used are data analysis, data presentation, and data verification. The validity of data used triangulation techniques. The results of this research showed an increase in enhancing students’ critical thinking ability that can be seen from the following indicators: 1) the ability to propose ideas, actions and responses increases from 24 % to 76 %, 2) the ability to understand the problem increases from 16 % to 72 %, 3) the ability to solve the problem increases from 16 % to 68 %, 4) the ability to conclude a statement increases from 20 % to 72 %. Therefore based on the research results, it can be concluded that the implementation of the scientific approach with cooperative learning strategies TGT type can improve students’ critical thinking ability for students in grade XI IPA 1 SMA 8 Surakarta.

Keywords: Critical Thinking, Scientific, Teams Games Tournament (TGT)

INTRODUCTION

Mathematics as the basic of sciences is very important to know. One of the basic competencies that need to be achieved in the learning of mathematics in school is critical thinking. According to Cockcroft (in Uno and Umar, 2009: 108),
mathematics achieve strength through symbols, grammar and language rules (syntax), and to develop critical thinking, axiomatic, logical and deductive.

Critical thinking is a process that is focused and clear used in mental activities such as problem solving, decision making, persuading, assumptions analyzing, and conduct scientific research (Johnson, 2012: 183). The lack of interest and problem solving in difficult math problem in learning process causes students' critical thinking ability are underdeveloped. They tend to avoid math and consider it as a scary lesson. In fact, many students have lack of confidence in learning mathematics. Therefore, teachers need an active, creative and fun learning methods. In this case, the selection of approaches and learning strategy plays an important role to obtain the optimal learning results.

Based of the initial observation from 25 students in class XI IPA 1 SMAN 8 Surakarta which consist of 7 male students and 18 female students, students critical thinking ability in learning of mathematics remains low. The low of critical thinking ability of students lead to the failure of the critical thinking indicators in mathematics learning, such as : 5 students with ability to propose ideas and responses (20%), 4 students with ability to understand the problem (16%), 4 students with ability to solve the problem (16%) and 5 students with ability to conclude a statement (20%). The low critical thinking ability of student lead to a lack of mathematics learning outcomes.

The low critical thinking ability of students in class XI IPA 1 SMAN 8 Surakarta is due to the learning process from the teachers who tend to use the conventional lecture method. The teacher-centered learning method cause the student less active and less critical in thinking. To solve the problem the teacher needs to implement the appropriate approach and learning strategies that can overcome the problems in improving students' critical thinking ability. One of the approaches and learning strategies that can be applied for these problems is scientific approach with cooperative learning strategies TGT type.

Scientific approach in learning process include observing, asking, trying, processing, presenting, summarizing, and creating for all subjects. For the certain subjects, materials, or situations, this scientific approach is not always appropriate
to apply. In this condition, the learning process must continue to implement the scientific values or nature and avoid the nonscientific values or attributes (Ministry of Education and Culture, 2013). To obtain the good results in learning with scientific approach, teachers need learning strategies that can be collaborated with the scientific approach. One of the learning strategies that can be collaborated with the scientific approach is the cooperative strategy TGT type. TGT cooperative strategy is a cooperative learning type or model that is easy to implement, involving the activities of all students without any differences in status, involving the students role as peer tutors and contain the game elements as well as reinforcement. Learning activities with game in a cooperative learning TGT allows students to be more relaxed in addition make responsibility, cooperation, fair competition, and learning involvement (Hamdani, 2011: 2). The collaborative learning between scientific approach with cooperative learning strategies TGT can help students to be active, creative, critical and comfortable in learning mathematics.

Based on the existing problems, this research aims to improve students’ critical thinking ability with a scientific approach with cooperative learning strategies TGT type.

**RESEARCH METHOD**

This research use Classroom Action Research (CAR) method with collaborative between mathematics teacher and researchers. CAR is the research about actual issues which is carried out by the teachers by doing observation to improve and enhance learning process in professionals class (Taniredja Tukiran et al, 2010: 15).

This research take place in SMAN 8 Surakarta which is located Sumbing Road VI / 49 Mojosongo, Jebres, Surakarta. This research was conducted over 3 weeks from 2013 January 9th to 25th. In this research, a mathematics teacher at SMAN 8 Surakarta act as a subject that gives the action. While the 25 students of class XI IPA 1 SMAN 8 Surakarta acted as subjects who received the
action. Students in class XI IPA 1 SMAN 8 Surakarta which are the subject of research, have low critical thinking ability in the learning of mathematics. This critical thinking ability include of the ability to propose ideas, and feedback, the ability to understand the problem, the ability to solve the problem, and the ability to conclude a statement.

This research is conducted collaboratively by the researcher, teacher and students. These three elements work together to get optimal results, so as are able to solve the problem. The steps that conducted in this research are as follows: 1) First dialogue, 2) Action Planning, 3) Implementation of the action, 4) Observation and monitoring, 5) Reflection, 6) Evaluation, and 7) Conclusion the result of Increased mathematics learning process.

Data collection techniques used in this research is observation method, field notes, test methods, and documentation. Data analysis techniques in this research using data collection, data presentation, and data verification.

Data validity checking techniques with continuous observation and triangulation. Triangulation is a data validity checking techniques which utilizing something else out of that data for checking purposes or as a comparison to the data. This research use the triangulation method by comparing the information or data obtained using interviews, observation, observation tests, and triangulation of data sources, the data checking test observations, observation result and documentation results.

RESULTS AND DISCUSSION

Based on the results obtained from the cycle I and cycle II, there is an improvement in students' critical thinking skills as expected in this study. The results of the second cycle show that a classroom action has been successfully applied to improve the critical thinking skills of students of class XI IPA 1 SMA 8 Surakarta.

This increase is suitable with the indicators used in the research. The indicators include: (1) the ability to propose ideas, and feedback, (2) the ability to
understand the problem, (3) the ability to solve the problem, and (4) the ability to conclude a statement. Improvement of critical thinking ability of students before action to the second cycle of action can be presented in the following table:

Table 1.1
Improvement of Critical Thinking Ability Students

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Before Action</th>
<th>Number of Students (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cycle I</td>
</tr>
<tr>
<td>The ability to propose ideas, and feedback</td>
<td>24% (6 students)</td>
<td>40% (10 students)</td>
</tr>
<tr>
<td>The ability to understand the problem</td>
<td>16% (4 students)</td>
<td>48% (12 students)</td>
</tr>
<tr>
<td>Problem-solving ability</td>
<td>16% (4 students)</td>
<td>32% (8 students)</td>
</tr>
<tr>
<td>Ability to conclude a statement</td>
<td>20% (5 students)</td>
<td>36% (9 students)</td>
</tr>
</tbody>
</table>
The graphics improvement critical thinking ability of students before and after class actions can be described as follows:

![Graph of Critical Thinking Ability Students Improvement](image)

**Figure 1.1**

**Improvement of Critical Thinking Ability Students**

Discussion from this study describes the results of action research that has been done. Critical thinking skills of students before the measures are still low. This can be seen from the variation in students' critical thinking indicators. The low critical thinking skills of students caused by conventional learning process. The results of the initial discussion and dialogue with a mathematics teacher gave motivation to researcher to improve the mathematics learning process so that students' critical thinking skills could be better. To overcome this problem researcher use the scientific approach with cooperative learning strategies TGT type. The indicators used in this study is that the student able to put forward
ideas and feedback, students able to understand the problem, student able to solve problems, and students able to conclude a statement.

After implementing use the scientific approach with cooperative learning strategies TGT type, learning process in the first cycle has not been fully achieved but have been increased. The reflection of that results can be used as a reference for implementing the second cycle of the classroom action. Implementation of the second cycle of the classroom action had been fully achieved and there are an improvement on all indicators as expected.

Learning with the application of the scientific approach with cooperative learning strategies TGT type has given students the opportunity to think critically. Scientific approach in learning process include observing, asking, trying, processing, presenting, summarizing, and creating for all subjects (Ministry of Education and Culture, 2013). Stages of scientific approach is a step to improve students critical thinking ability.

The increase of students critical thinking ability can be seen in the students ability to propose ideas, understand problems, solve problems and conclude a statement in the learning process. The fourth indicator of students' critical thinking in accordance opinions expressed by Angelo (in Santoso, 2009) suggests five systematic behavior in critical thinking. That five behavior are:

1. Analyze skills, is a skills to explain a structure into components in order to determine the organization of that structure.
2. Synthesize skills, is a skills to combine parts into a new arrangement.
3. Recognize and solve the problem skills, namely the skills to apply concept into some understanding.
4. Conclude skills, is the activities of the human mind by understanding / knowledge he has to reach a new understanding.
5. evaluate skills, namely the ability to determine the value of something based on certain criteria.

The classroom action research is doing by researchers along with math teacher at SMAN 8 Surakarta using a scientific approach with cooperative learning strategies TGT type can improve students critical thinking ability. This
means that the hypothesis is accepted and supported by action research results. Learning and teaching process that have been reported in the evaluation of a class action also supports the hypothesis. Actions of teachers in the learning process has been as expected. Mathematics teacher as subject in the learning process say that students critical thinking ability increased after the action.

This means that the action hypothesis acceptable which supported by relevant research results. Yuli (2013) concluded the application REACT strategy based NHT can improve the ability of students to think critically and creatively. Hawa Liberna (2012) in her research concluded that applying the Improve methods for improving critical thinking ability to learn math better results with the conventional method. Penelitian dalam upaya meningkatkan daya kritis siwa lainnya dilakukan oleh Ifada Novikasari. The other research in an effort to improve students critical thinking ability conducted by Ifada Novikasari. Ifada Novikasari (2009) in her research concluded that the development of an open-ended of mathematics learning with student centered models can improve critical thinking ability of student. The results of the research by Ali Syahbana (2012) concluded that there is a significant difference in the improvement of critical thinking ability among students who use the Contextual Teaching and Learning Approach and Conventional Approach. In addition, Syahrir (2011) concluded that the Jigsaw cooperative learning methods and TGT (Teams Games Tournament) effective toward the skills and motivation to learn mathematics.

CONCLUSION

Based on the results of classroom action research by implementation of the scientific approach with cooperative learning strategies TGT type in order to improve students' critical thinking skills class XI IPA 1 SMA 8 Surakarta can be conclude that the scientific approach with cooperative learning strategies TGT type can improve the ability of students to propose ideas and feedback, understand the problem, solve the problems, and concluded a statement.

The improvement of critical thinking ability through scientific approach with cooperative learning strategies TGT type can be seen from the improvement
of critical thinking ability indicators, such as: (a) the ability to propose ideas, and feedback, before the action are 24% (6 students), in cycle I reaches 40% (10 students) and in cycle II reaches 76% (19 students), (b) the ability to understand problem, before action are 16% (4 students), in cycle I reaches 48% (12 students) and in cycle II reaches 72% (18 students), (c) the ability to solve problem, before action are 16% (4 students), in cycle I reaches 32% (8 students) and in cycle II reaches 68% (17 students), (d) ability to conclude a statement, before action are 20% (5 students), in cycle I reaches 36% (9 students) and in cycle II reaches 72% (18 students).

**BIBLIOGRAPHY**


