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The Comparison Of Students' Critical Thinking Skill By The Implementation Of Think Pair Share And Student Teams Achievement Division Cooperative Learning Model In Biology Instruction At SMAN 2 Singaraja

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Abstract
Critical thinking skills are very useful for students to enter the world of work, so it really needs to be trained in the learning process. This research aims at analyzing the differences of students' critical thinking skills through implementation of Think Pair Share (TPS) and Student Teams Achievement Division (STAD) Cooperative Learning Models in Biology Instruction at SMA Negeri 2 Singaraja. To achieve that purpose, it has been done a quasi-experiment research which used Nonequivalent Pretest Posttest Control Group Design. The population of this research were all of class XI MIPA (7 classes) at SMA Negeri 2 Singaraja. The research' samples were class XI MIPA 3 and XI MIPA 4 which is determined by simple random sampling technique by lottery. By these two classes, one class was taught by TPS, there were 32 students. Another one class was taught by STAD, there were 33 students. The data is analyzed by using the descritive analysis and the use of Anacova statistic. By the Anacova testing, it was obtained a statistical value of F = 8,776 with a significance of 0.004. It indicated that (1) there were differences in the critical thinking skills of the students who were taught by TPS with the students who were taught by the STAD and (2) the average value obtained by the group of students who were taught by the TPS cooperative learning model (75.31) was higher than the average value of groups of students who were taught by the STAD cooperative learning model (68.67).

Keywords: *Critical Thinking Skill, Cooperative Learning Model, Think Pair Share, Student Teams Achievement Division*

INTRODUCTION

Globalization competition demands high quality human resources. Improving the quality of human resources is an absolute prerequisite for achieving development goals. One way to improve the quality of human resources is through education. The development of the quality of human resources has been pursued by the government, one of which is by improving the quality of education. Improvements of the education quality have been carried out by the government involve in improving the curriculum, procuring textbooks and increasing the pedagogical and professional competencies of education staff through various trainings.

The problem of the education quality needs special attention in order to be able to have a competitive advantage and be able to take a role in the era of globalization (Ruffi, 2015). The paradigm shift in the field of education is very important for everyone to do in the face of technological developments, to face the era of information and free trade (Santyasa, 2012). The quality of education in Indonesia is still not optimal and has not fully met the expectations of society. This occurs due to various influencing factors, namely educators are too dominant in the learning process so that students become passive in receiving knowledge (Ruffi, 2015; Santyasa, 2012). However, most teachers indicated their belief that providing students with HOTS is essential for students' future. Among the reasons are to prepare students to face the challenges of the 21st century (Driana, E., et al., 2021)

One of the government's efforts in the context of equal distribution of education, the government issued new rules in student admissions through the regulation of the Minister of Education and Culture Number 17, year of 2017 which concerning the Admission of New Students (PPDB). By this regulation, it is regulated regarding the zoning system that schools must apply in accepting candidates (new student). The implementation of the school zoning system organized by the local government is obliged to accept prospective students who are domiciled in the radius of the nearest zone from the school at least 90% of the total number of accepted students. This has an impact on students who experience challenges due to heterogeneous classes. Students who are slow will lag behind their friends and become uncomfortable in learning. Then students who are fast in learning can lose motivation if they don't get a challenge (Darmawan, 2019). The other hand, the elements involved in the implementation of education, namely students, teachers, objectives, content of education, methods, and the environment. Teachers and students are the key to the occurrence of education. In the context of formal education, those who act as educators are teachers. Teachers have an important and very influential role in the educational process. The regulation of Indonesian Government Number 14, year of 2005 concerning educators and lecturers, teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing and evaluating students, in early childhood education, formal education, basic education, and secondary education (Munib, 2010).

It has been done an observation at SMA Negeri 2 Singaraja for reviewing process of biology instruction. The observation results were obtained the students' average score of daily test at class of XI MIPA is about 71.00 before being taught using the TPS and STAD cooperative learning models. Furthermore, there were several obstacles that could be identified in SMA Negeri 2 Singaraja are as follows: (1) learning is still not optimal in utilizing the environment to carry out direct practicum; (2) teachers prefer to use one source of textbooks in learning process; (3) lack of structuring the

innovative learning environment, tend to use conventional approach; (4) students are not given the opportunity to study in small groups for discussing learning topic or solving problems, just any time to use conventional group; and (5) students' scientific skills not have been yet properly trained, students are very seldom do performance assessment and in practicum in the laboratory. In this regard, we need a learning model that can help students to enhance their scientific skill. The appropriate learning model to be applied is a learning model which linking the biology content with the surrounding environment. So it will encourage students to make connections between their knowledge and its implementation in everyday life. Therefore, the learning model will able to improve students' critical thinking skills towards mastering the concept of any topic or content in biology subject matter.

Biology is one of the subjects or lessons that need to use an appropriate learning model. The model used in learning biology must attract and activate students in the learning process. The application of appropriate learning models can make biology instruction more effective at SMA Negeri 2 Singaraja, students' activities will be varied and more meaningful. The students will more easily understand about the biology content and also expected to have social skill. In another word, the selection of the appropriate learning model can affect students' activities and learning outcomes. One of the learning models that can be applied for biology instruction at SMA Negeri 2 Singaraja is cooperative learning model. Cooperative learning is a learning model in which the system learns and works in small groups collaboratively so that it can stimulate students to be more passionate about learning. Cooperative learning has a positive impact on learning; students are given the freedom to be actively involved in their groups. In a cooperative learning environment, students must become active participants and through their groups can build a learning community that helps each other (Trianto, 2014). The teacher's role in cooperative learning is limited to being a facilitator or mentor, motivator, and evaluator for students (Tukiran 2014).

There are many type of cooperative learning model that can be chosen for conducting biology instruction, namely Student Teams Achievement Division (STAD), Think Pair Share (TPS), Group Investigation (GI), and Jigsaw. So, the teachers should make into account to choose one of them which is based on the characteristics of students and biology teaching material. Research of Naviano and Wutsqa (2017) reported that learning by using scientific approach through the Student Teams Achievement Division (STAD) is not more effective than the Think Pair Share (TPS) in terms of motivation and learning achievement. This statement is in line with the result of research conducted by Mawar, et. all (2018), by the fact that average score obtained by students in the use of TPS is about 80.46 and in the use of STAD is about 62.34. By these two researches, Cooperative learning models that can be used at SMA Negeri 2 Singaraja are Think Pair Share (TPS) and Student Teams

Achievement Division (STAD). The advantage of the Think Pair Share (TPS) learning model is that it requires students to think more so that students can remember, understand and construct problems given in the learning process so that students' critical thinking skills can develop optimally. Student Teams Achievement Division (STAD) learning has the advantage of requiring students to be able to master concepts and apply them in everyday life so that they can optimize critical thinking skills.

Based on the literatures review as mention before, both TPS and STAD cooperative learning model can facilitate students to enhance the critical thinking skill. The critical thinking skills that are examined in this research involve in ability to identify, analyze and solve problems creatively, and think logically to produce appropriate considerations and decisions. The critical thinking skills are not such skill that can be developed by itself along with human physical development. This skill must be trained through the provision of a stimulus that requires a person to think critically (Mulyani, 2015). Therefore, it is necessary to do a research in order to know the comparison of critical thinking skills between Think Pair Share (TPS) and Student Teams Achievement Division (STAD) cooperative learning models.

METHOD

The research was conducted by using a quasi-experiment. The research design used is Pretest Posttest Nonequivalent Control Group Design. The population of this research was 7 classes of XI MIPA at SMA Negeri 2 Singaraja. The research' samples were class XI MIPA 3 and XI MIPA 4 which is determined by simple random sampling technique by lottery. By these two classes, one class was taught by TPS cooperative learning model and another one was taught by STAD cooperative learning model. Data collection used an instrument test of critical thinking skill which has been validated before. The data is analyzed by using the descriptive analysis and the used of Analysis Covariance (Anacova) statistic. Before testing the hypothesis, it has been done the normality test and the homogeneity test of all the data. The results of the normality test of research data for class taught using the Think Pair Share (TPS) and Student Teams Achievement Division (STAD) were 0.198 ($p > 0.05$) and 0.200 ($p > 0.05$), respectively. It can be concluded that the two data are normally distributed. The statistical value of Levene's Test has a significance number of 0.294 ($p > 0.05$). This shows that the variance between groups of learning models is homogeneous. Considering to the result of these two assumtion tests, the used of analysis of covariance (Anacova) can be continued to testing the research's hypothesis. The hypothesis testing used a significant value of 0.05 ($\alpha = 0.05$).

RESULT AND DISCUSSION

The results of the descriptive analysis on students' critical thinking skills which was obtained by pretest and posttest can be seen in Figure 1.

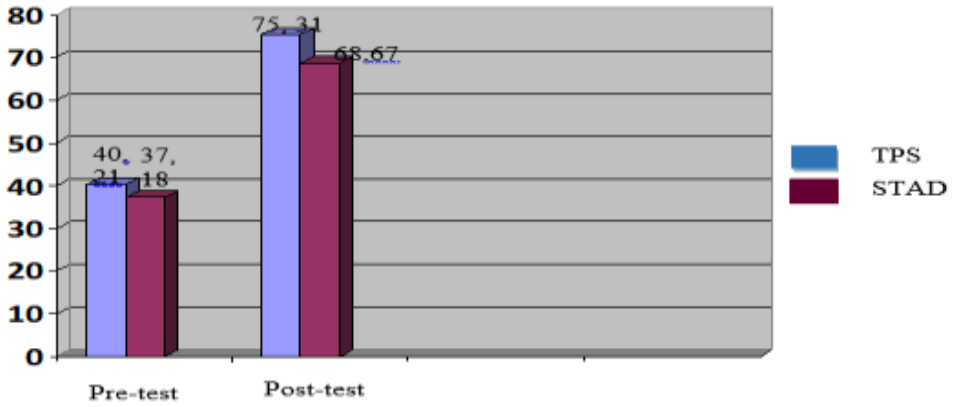

Figure 1. An Average Score Of Critical Thinking Skill

By the Figure 1, it can be seen that in each unit of analysis there is an increase in the average score of critical thinking skill. In the class that was taught by TPS cooperative learning model there was an increase in the average score of 35.1 and the class that was taught by STAD cooperative learning model there was an increase in the average score of 31.49. So it can be stated that in the TPS class there was a higher increase of 3.61 than the STAD class. The data shown that an average score of the students' critical thinking skill which was obtained through posttest is about 75.31 for the TPS class and 68.67 for the STAD class. Qualitatively, this fact indicates that TPS cooperative learning model is more suitable and effective to use than STAD cooperative learning model to improve students' critical thinking skill in biology instruction. Before being given treatment, students who were taught with the Think Pair Share (TPS) cooperative learning model had an average value of critical thinking skills on understanding the excretion system concept of 40.20 with less qualification. Critical thinking skills in understanding the concept of the excretory system of students who are taught using the Student Teams Achievement Division (STAD) cooperative learning model have an average score of 37.18 with very poor qualifications.

After being given treatment, the post-test results showed that the average score of the students' critical thinking skills had increased. The group of students who took part in learning using the Think Pair Share (TPS) cooperative model had an average Post-test score of 75.31; this value was included in the good qualifications. The results of this post-test showed that the group of students who took part in learning using the Think Pair Share (TPS) cooperative model was able to increase their critical skills by 35.31 from 40.21 to 75.31. Meanwhile, the group of students who took part in learning using the Student Teams Achievement Division (STAD) cooperative model had an average

post-test score of 68.67 which was included in sufficient qualifications. The results of this post-test showed that the group of students who took part in learning using the Student Teams Achievement Division (STAD) cooperative learning model was able to increase their critical thinking skills by 31.49, from 37.18 to 68.67.

The discussion presented in this subsection is the comparison of the TPS cooperative learning model and the STAD cooperative learning model on the critical thinking skills of high school students in biology learning. The results of this study after analysing the posttest score can be described that there are differences in critical thinking skills in students who are taught by the TPS cooperative learning model and in students who are taught by the STAD cooperative learning model. The students' critical thinking skills in TPS class is higher than the STAD class.

Hypothesis testing was carried out using one-way analysis of covariance (Anacova). A summary of the results of hypothesis testing using one-way Anacova is presented in Table 1. Based on the summary of one-way ANACOVA presented in Table 1, it can be described as follows. Firstly, the source effect of the pretest (as a test of prior knowledge) on the students' critical thinking obtained a statistical value of F = 20,804 with a significance value of 0.001. This means that there is a significant effect of the covariate on students' critical thinking skills because the significance number is less than 0.05 ($p < 0.05$). So, there is a difference in students' critical thinking skills in the TPS cooperative learning model and the STAD cooperative learning model. It is indeed true because of the learning treatment given.

Table 1. Summary Of One-Way Anacova For Teh Students' Critical Thinking Skill

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected model	1745.673[a]	2	872.836	17.661	0.001
Intercept	9028.724	1	9028.724	182.691	0.001
Pretest	1028.127	1	1028.127	20.804	0.001
Posttest (TPS & STAD)	433.708	1	433.708	8.776	0.004
Error	3064.081	62	49.421		
Total	341194.000	65			
Corrected amount	4809.754	64			

a. R-square = 0.363 (customized R-square = 0.342)

Secondly, by source effect of cooperative learning model (TPS class and STAD class) on the students' critical thinking skills obtained a statistical value of F = 8,776 with a significance value of 0.004. This significance value is smaller than 0.05 ($p < 0.05$). So, it can be concluded that there is difference in students' critical thinking skills for class that was taught by TPS cooperative learning model and STAD cooperative learning model in biology instruction at SMA Negeri 2 Singaraja. In

other words that the hypothesis formulated in this research is accepted. Therefore, it can be stated that the implementation of the TPS cooperative learning model is better (or superior) than STAD cooperative learning model for teaching critical thinking skill in biology instruction, in term of any biological topics which require problem solving.

The results of this study are in line with research conducted by Mawar, (2018). In his research, it was found that students who were taught by the TPS cooperative learning model got higher scores than students who were taught by the STAD cooperative learning model. Besides that, successively other researchers who obtained similar results, namely research conducted by Naviano and Wutsqa (2017) and Rifahamin (2015), the results in these studies obtained that the STAD cooperative learning model was not more effective than the TPS cooperative learning model, in terms of students' motivation and learning achievement. The suitability between the results of this study can strengthen the advantages of implementing the TPS cooperative learning model compared to the STAD cooperative learning model. Based on the results of the research discussed above, it proves that the TPS cooperative learning model is superior to the STAD cooperative learning model, in term of critical thinking skills.

Better students' critical thinking skills are found in classes taught by the TPS cooperative learning model because learning activities are initiated by students who think individually to solve a problem given by the teacher. The thinking process has a major contribution in improving the learning outcomes obtained by students, because when thinking activities students are required to be able to solve problems and are required to remember and understand first the problems given. Then, construct them so that in the thinking process students can get used to practicing understanding and problem solving skills by using their own abilities. Cahyono (2017) illustrates that the thinking process is a process that aims to obtain information (from outside or students), processing, storing and recalling information from students' memories. Thus, it can be said that the principle of thinking includes three main steps, namely the formation of understanding, the formation of opinions, and drawing conclusions, so that by going through the process of thinking the level of knowledge of students will be better. The thinking process is a cognitive skill and intellectual position that students need actively to identify and analyze arguments, also truths to decide and give the right reasons and support conclusions and make reasonable decisions about what to do. Ramdani (2015) also states that the thinking process can help students form concepts, reason, think critically, make decisions, think creatively, and solve problems so that the learning outcomes obtained by students become more optimal.

By sharing the ideas and think loudly in pair, student will get a new perspective in an effort to solve problems that involve their metacognitive abilities. Student learning activities during the

implementation of TPS cooperative learning model are closely related to processes of interpreting, analyzing, evaluating, and explaining. This fact is in line with the research finding that conducted by Utami, et al., (2019). The result of the research shows that by the problem solving model of students' critical thinking skill in interpreting, analyzing, concluding in very good category, and evaluating, explaining, and self-regulating in good category. Warpala (2019) stated that the overall process during problem solving in pair or small group learning consist of three level of cognitive processes. The first process is skill acquisition, where students are introduced to cognitive instruction which includes identifying, determining, and learning certain thinking skills. The second process is called making meaning, namely learning about how to provide opportunities to practice skills through appropriate processes of using critical thinking skills. The third process is transfer and application (thoughtful application), which is rooted in metacognitive reflection on learning. From this third process, it is hoped that students will have higher order thinking skills that can be adapted to different academic and personal situations during their lives (Warpala, 2019).

The results of individual students' thoughts are then discussed with their classmates through pairing activities which have the same contribution as the thinking process. In this process, students are required to be able to compare the answers that have been thought of individually with their partners to look for similarities and differences in the results of each individual's thinking. So, the students are trained to communicate their opinions or ideas in solving problems on the student's work sheet as well as information that has been discussed with each partner. During discussions with partners, students share information or answers to the whole group through presentation activities (sharing). This activity familiarizes students to develop the results of thoughts, ideas or ideas that lead to the completion of the problems that have been discussed previously, so that the results obtained by students are better than before. When sharing answers, students are required to be able to compile and categorize the answers that have been put together with their partners so that the answers that will be presented with their partners are easy to understand and have the correct answers. The role of the teacher in this case is only as a motivator and evaluator. Through the process of discussion and presentation, students are given a lot of space to increase their activity and creativity in seeking information related to the material presented. Based on the activities carried out by students, it can be concluded that the Think Pair Share (TPS) cooperative learning model has a major contribution to improving student learning outcomes as well as critical thinking skill.

The Student Teams Achievements Division (STAD) cooperative learning model also contributes to improving critical thinking skills. The initial process in learning activities is the activity of teachers who provide subject matter to students. Giving material at the beginning of learning makes students passive in the learning process, because the learning process only occurs in one direction,

namely teacher to student, so that the role of students is only as recipients of information. This does not maximize learning in the classroom so that the impact on improving students' critical thinking skills is less than optimal, because the learning material explained by the teacher at the beginning of the lesson will pass by and easily be forgotten. The learning model is also less than optimal to train critical thinking indicators, evaluate assumptions and draw inferences. Opportunities for students to explore critical thinking indicators to interpret knowledge statements and ideas are also limited. This statement is supported by research conducted by Lubis (2015) which states that when teachers play a full role in learning, students do not have the opportunity to develop their own knowledge because any problems that arise in learning will be solved by the teacher, so students become passive, while the learning model used by the teacher must make students active in the learning process, because student activity can affect learning outcomes.

In contrast to the initial activities in the Think Pair Share (TPS) cooperative learning model, students are really required to think and find their own answers. This makes the students' memory of problems related to learning materials last longer than the initial process in the Student Teams Achievement Division (STAD) cooperative learning. It means that teachers should no longer teach as the only information provider in the learning process, teachers should teach students in a learning context. By training students to find solutions to their own problems, it means that students are also trained in their thinking skills, especially critical thinking skills. This statement is supported by research conducted by Lukitasari (2013), one of the important benefits of critical thinking skills is to solve problems encountered in everyday life. Think Pair Share (TPS) learning model is an appropriate learning model if it is used to train critical thinking skills.

Based on the above explanation, it clearly shows that there are differences in critical thinking skills between students who learn to use the Think Pair Share (TPS) cooperative learning model and students who learn to use the Student Teams Achievement Division (STAD) cooperative learning model, where the Think Pairs type cooperative learning model Pair Share (TPS) has a better effect on students' critical thinking skills compared to the Student Teams Achievement Division (STAD) cooperative learning model.

CONCLUSION

Based on the results of the research and discussion that has been described, the following conclusions can be drawn. There are significant differences in critical thinking skills between students who are taught by the Think Pair Share (TPS) cooperative learning model and students who are taught by the Student Teams Achievement Division (STAD) cooperative learning model. The average score

of critical thinking skill that obtained by the group of students in the TPS class was higher than the group of students in the STAD class.

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