

THE EFFECT OF LEARNING METHOD AND CRITICAL THINKING ABILITY TO THE LEARNING OUTCOMES ON NATURAL SCIENCES OF CLASS 5th STUDENT

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Abstract: This study aimed to determine the effect of teaching methods *Teams Games Tournament* (TGT) and learning methods *Talking Stick* and critical thinking skills to the learning outcomes of natural sciences. This research was conducted at the Primary School. The study design using analysis of variance 2 lanes (ANOVA). The results of this study were (1) the results of elementary school students learn science learning with the learning method TGT higher than the results of elementary school students learn science learning with the learning method *Talking Stick*. (2) There is an interaction effect between teaching methods and students' critical thinking skills to the results of elementary school students learn science. (3) The results of elementary school students learn science which have high critical thinking skills are learned by the learning method TGT has a higher influence than students learning with the learning method *Talking Stick*. (4) The results of elementary school students learn science that has the ability to think critically low learning TGT learning methods that have lesser influence than the students learning with the learning method *Talking Stick*.

Keywords: *Teams Games Tournament, Talking Stick, Critical Thinking.*

1. INTRODUCTION

Role huge science in human life. The development of science is always accompanied by the development of technology. Natural sciences is not merely a collection of knowledge about objects or living things, but it requires work, how to think and how to solve the problem (Usman Samatowa, 2011). Thus, the natural sciences is not simply expect people it just only know about objects or living things around it but also how to think and solve a problem in their daily lives. Natural sciences is part of science to understand the system of nature and part of the science that has been standing alone that keeps on digging and corrected (Richard, 2007)

TGT is a learning method that uses what is known about small groups and academic motivation. TGT is able to produce positive results in social attitudes and academic dimensions of performance, it is both practical program designed to be used in a typical classroom, without major expenditure or effort, and research tools that are useful in the process of group norms peer, the attitude of students and academic motivation can be studied by means of experimental manipulation in the natural classroom space (David L. De Vries)

(Slavin, 2010) made four steps that can be used for cooperative learning TGT: (1) Presentation of the class, (2) The formation of the group, (3) Games, (4) Tournament, (5) a group Choice. This type of cooperative learning TGT is expected to develop the ability to critically think with students, students do not feel bored because the element of play in them, establish cohesiveness among the students because their study groups and make students become more active in the learning process.

TGT, which consists of three components - a team, games, and tournaments is an extension of the general concept involves placing a team competition. Component team of students at four or five teams. Tim created to establish maximum heterogeneity within each team (in dimensions such as academic ability student, gender, and race) and the comparability of the whole team (David L De Vries).

Five characteristics in cooperative learning: (1) *Positive Interdependence*, (2) *Personal responsibility*, (3) *Face-to-face promotive interaction*, (4) *interpersonal skills*, (5) *Group Processing* (Agus, 2015). The characteristics and the basic principles of *cooperative learning* must be understood by the teacher, without a deep understanding of and exposure

characteristics and this learning cooperative principles, the implementation of this model of teaching and learning will not get optimal results.

Use of the method of *talking stick* their real life experience will be very valuable catch because they allow students and teachers to make connections with other stories or questions might strike in their own experience (Sheila M Allen). Learning with the method *talking stick* encourages students to dare to express opinions. Learning *Talking Stick* is a learning implemented by way of freedom for learners to be able to move and act freely as far as possible to avoid the elements of command and compulsion long as no harm to students with the intention to grow and develop confidence.

Learn about thinking *critical* may be an important strategy and complementary to learning through *critical thinking*. (Nan Bahr, 2010) gave us the concept of critical thinking and vocabulary to explain what went wrong. This promotes understanding and more effective discussions, good critical thinking is a cognitive skill. generally, develop the skills of learning theory requires three conditions, deliberate practice, and adopt the right attitude (Joy F Lau, 2011). Based on the above understanding, the efforts to improve

critical thinking skills can be developed through learning that is *student centered* learning is student-centered.

2. Methods

This conducted by using the experimental method to compare two methods of learning *Teams Games Tournament* and learning methods *Talking Stick* with moderator variables have the ability to critical thinking. research design *Treatment by 2x2 level* which is the development of a *true experiment design* that takes into account the possibility of variable moderators that affect treatment (independent variable) on learning outcomes (dependent variables).

The variables of this research consists of one independent variable and the moderator variables. The independent variable is the learning method that consists of TGT (A1) and learning methods *Talking Stick* (A2). Meanwhile, the moderator variable in this study is the ability of critical thinking which consists of high critical thinking skills (B1) and the ability to think critically low (B2) while the dependent variable is the result of learning science.

Table1. Research Design *Treatment by level of 2x2*

Capability	Learning Method	
	TGT (A1)	<i>Talking Stick</i> (A2)
Height (B1)	A ₁ B ₁	A ₂ B ₁
Low (B2)	A ₁ B ₂	A ₂ B ₂

3. RESULTS

science learning outcome data obtained after the teacher make the learning process by applying a predetermined learning methods, give the task learning and evaluate student learning outcomes. Achievement test adjusted for indicators have been prepared on the

taxonomy Boom Anderson version that aims to determine the outcome learn science with the expectation of the influence of the treatment given to the learning outcomes of natural sciences. The following description of the calculation result data and research results:

Table 2. Description of the research data value X and A

Learning Method	TGT (A1)		TS (A2)		Total	
	Informati on	Score	informati on	Score	informatio n	Score
Critical Thinking	n_1	10	n_2	10	n_{b1}	20
	X1	876	X2	683	Xb1	1559
	X1 ²	76 956	X2 ²	47119	Xb1 ²	124 075
	X ₁	87.60	X ₂	68.30	Xb ₁	77.95
	(X1) ²	767 376	(X2) ²	466489	(Xb1) ²	2430481
	n_3	10	n_4	10	n_{b2}	20
Low (B2)	X3	705	X4	736	Xb2	1441
	X3 ²	49 965	X4 ²	54 404	Xb2 ²	104 369
	X ₃	70.50	X ₄	73.60	Xb ₂	72.05
	(X3) ²	497 025	(X4) ²	541,696.00	(Xb2) ²	2076481
	$n_{k1,}$	20	n_{k2}	20	n_t	40
	X _{k1,}	1581	X _{k2}	1419	X _t	3000
Total	X _{k1,} ²	126 921	X _{k2} ²	101 523	X _t ²	228 444
	Xk ₁	79.05	Xk ₂	70.95	X _t	75.00
	(Xk1) ²	2499561	(Xk2) ²	2013561	(xt) ²	9000000

Hhypothesis of this study is inferential tested using Analysis of Variance (ANOVA) two streets. This research there are two independent variables and one dependent variable. The independent variables are (1) Learning Method (TGT and *Talking Stick*) and (2) Critical Thinking Skills (high and low) The

dependent variable was the learning outcomes High Order Thinking Skills (HOTS).

Based on these calculations obtained the following results:

Table 3.Results of Analysis of Variance Two Line

Sumber Variansi	Db	JK	RJK	F _{count}	F _{table}
Learning Method	1	656,10	656,10	32,961	4,11
Critical Thinking Skills	1	348,10	348,10	17,488	4,11
Interaction	1	1254,40	1254,40	63,018	4,11
Fallacy	36	716,60	19,91		
Total	39	2975,20			

Results of two-way analysis of variance above can be explained as follows:

1. The results of the analysis of variance of two paths between columns (Learning method) obtained $F_{\text{count}} = 32.96$ on $F_{\text{table}} (0,05) = 4.11$, then H_0 is rejected, it means there are differences in learning outcomes of natural sciences elementary school students who study with IGT method (A1) and learning with the learning method *Talking Stick* (A2). The average value of a group of students studying at IGT method (A1) with a group of students learning with the learning method *Talking Stick* (A2) is $XA_1 = 79.05$ and $XA_2 = 70.95$.
2. Based on the analysis of variance of two paths between columns (Learning Method) and between rows (Critical Thinking Skills) obtained $F_{\text{count}} = 63.18$ in $F_{\text{table}} (0,05) = 4.11$ then H_0 is rejected, it means there is a very significant interaction effect among the learning method with the ability to think critically about science student learning outcomes. Such interactions are presented in the form of images.

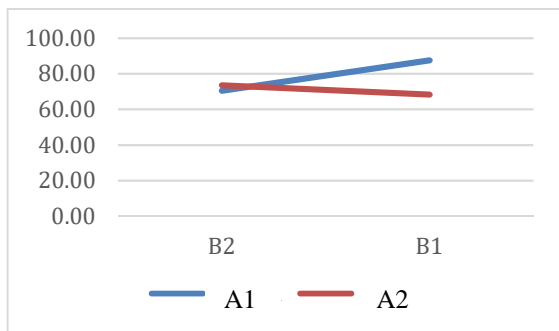


Figure 1. Graph Interaction between Learning Methods and Critical Thinking Ability

3. Based on the results of the analysis of variance of two paths between rows (Critical Thinking Skills) obtained $F_{\text{count}} = 17.48$ is greater than $F_{\text{table}} (0,05) = 4.11$, which means H_1 received and refused H_0 . The third hypothesis states there are differences in learning outcomes IPA significantly between students who have the critical thinking skills of high and low.

The results of summary calculations each pair test group *Tuckey* are presented in the following table.

Table 4. Test Results Continue with Tuckey Test

No.	Hypotheses Statistical	Q _{arithmetic}	Q _{tables} (= 0.05)
1	$uA_1B_1 > uA_2B_1$	13.68	2.042
2.	$uA_1B_2 < uA_2B_2$	2.20	2.042

Based on the analysis of variance and test Tuckey above, it can be stated that:

- a. the third hypothesis states that, learning outcomes of natural sciences elementary school students between groups of students learning with the learning method TGT who have the ability to think critically high is higher than on learning outcomes for a group of students studying with the learning method *Talking Stick* that has the ability to think critically high.
- b. the average value of learning outcomes of natural sciences study groups with low critical thinking TGT method is lower than the results of elementary school students learn science who studied with the method *Talking Stick* that has the ability to think critically low.

4. DISCUSSION

Discussion of results of hypothesis testing further research is as follows:

Differences in Learning Outcomes Science Elementary School Students Who Learn Methods *Teams Games Tournament* and Methods *Talking Stick* (A1 and A2)

The findings obtained in this hypothesis is the result of learning science students with methods TGT higher learning than students learning with the learning method *Talking Stick*. That is because the learning method TGT constructivism-oriented framework. In the exercise of TGT learning methods in primary school, the main points in the learning TGT is a group, play, Tournament.

One of the other characters that can be known from primary school age children are liking them to do something better learn or play in groups. Like play is characteristic of elementary school age children because of play makes students become more enthusiastic and feel depressed. Tournaments can make students who like to seek attention can develop their ability to learn, the tournament can also make a child who cannot sit still to reveal his ability through this method.

Characteristics of elementary school students age range 7-11 years said that "concrete thought operations (7-11 years). Children develop the ability to think systematically, but only when they can refer to objects and concrete activities " (Elizabeth, 2007).

TGT learning implementation is one of cooperative learning methods that involve the activity of learners, involving the role of students as peer tutors, and contains elements of the game. Because learning is done with playing, it is possible arise pleasure of learners to participate in learning. With the interest generated in the following study, it is possible also a better learning outcomes. This explanation is consistent with the

theory that playing is an activity that can stimulate children's creativity and thinking power optimally without the child feel compelled to do so (Aris Priyanto, 2014).

Based on the views expressed by Schunk that peers have an impact on learner motivation. When the application of the method TGT children with the teacher directs students to be able to work together with friends without picking, is able to express his emotions, capable of controlling emotions and can understand the feeling of other friends for teaching and learning activities occurred and the child can follow the rules that apply during learning activities occurred.

Interaction Between Learning Methods and Critical Thinking Ability of Primary School Science Learning Outcomes.

Based on the statistical analysis of the results of elementary school students learn science are mutually influenced by two independent variables in this research, methods of learning and thinking skills Critical raises the presence of interactions. The more appropriate teaching methods are used the more effective and efficient learning activities conducted between teachers and students will eventually deliver the support and success of student learning and teaching success made by the teacher. Guru should be able to choose exactly what methods will be used in the learning process by looking at the learning objectives to be achieved, the circumstances and the level of development of students, including the ability Critical thinking of student. therefore, in the process of learning in elementary school, teachers must be able to establish learning method in accordance with the critical forward-thinking ability of students in primary schools.

Students who have thinking ability *critical* high will be able to look at a problem something challenging and must be completed and controlled, so that the problem can be drawn a conclusion.

While elementary school students who have the ability to think critically low tends to understand the problem as a whole and prefer to problems that are not too complicated.

Thus it can be explained that the provision of appropriate learning methods must be adapted to the critical thinking skills of elementary school students who will assist in improving the results of elementary school students learn science.

Differences in Student Learning Outcomes Given natural sciences Treatment Method of Learning *Teams Games Tournament* which has a high critical thinking skills by learning methods *Talking Stick* which has a high critical thinking skills.

Elementary school students who have a high critical thinking skills to be able and feel comfortable if given the task of learning. This is because the elementary school students who have a high ability to think critically consider all the learning provided is a challenge that must be resolved, so that when do it can be faced with calm.

Students who have high critical thinking skills will be easy to draw conclusions in the learning process for elementary school students who have been accustomed to critical thinking skills in scrutinizing, determining and interesting in learning the wrong reasoning or illogical nor correct or conclusions. In addition to the elementary school students who have a high critical thinking skills can accurately interpret the facts and perceptions that he encountered or heard by others making it easier for students to complete the tasks given. As well as elementary school students who have a high critical thinking skills have been trained in the technique of determining an assumption assumptions and implications with a systematic and orderly.

Learning TGT Elementary School is suitable for students who have the ability to think critically high is in the

process of learning to make students become more memory and increase his understanding of the subject matter, an increased focus on relevant knowledge, encourage to think, build teamwork, leadership, and skills, build learning skills (*long-life learning* skills), and to motivate students.

Meanwhile, for students who have the ability to think critically high given the treatment with the learning method *Talking Stick* will experience difficulties in the learning process. In the method of *Talking Stick* students are only required to answer questions given by the teacher to the students who hold a stick, so that students who do not have the mental preparation and the low could result in student's *shock therapy* so that students have the ability to think critically is not channeled ability that they have.

Differences Learning Outcomes Science Students Awarded Treatment Method of Learning *Teams Games Tournament* which has the ability to think Critical low with Learning Method *Talking Stick* which has the capability of Critical Thinking Low

Elementary School Students who have the ability to think critically low in the learning process more fun when learning in a way that simple. In addition to the elementary school students who have the ability to think critically low will be in trouble if from a concrete problem that serve as the foundation of the learning process. This is because the elementary school students who have the ability to think critically low more pleased with the learning process is simple but pleasant, so that students feel more able to understand the learning materials. And also, the elementary school students who have the ability to think critically low prefers learning process involving students actively in an experiment that has been set theme learning by previous teachers, elementary school students who have the ability to think critically low given the treatment with learning methods *Talking*

Stick to achieve success in learning as a step in the learning process by using the *Talking Stick* is simpler and easier to understand by elementary school students who have the ability to think critically low.

Students who have the ability to think critically low using TGT learning experience difficulties in the learning process so that success in learning can be decreased. It is caused by step learning method TGT elementary school students more focused on faster, creative, critical in answering the question. For elementary school students who have the ability to think critically low will experience confusion in finding an answer to the question, because of its nature of elementary school students who have a lower critical thinking skills are less able to find an exact truth of a problem. As well as elementary school students who have a lower critical thinking skills to be bored to find a problem that resulted in the students become the focus in the learning process.

Other factors that lead to elementary school students who have the ability to think critically low experiencing difficulties in the learning process by using learning methods TGT is a step of the learning process that requires students to think fast, nimble, creative to understand a problem in depth, collect and share information, formulate solution, the best solution and present a solution so that students who have the ability to think critically low will be lazy in his grasp because of the limited ability of students to understand the issues in depth.

5. Conclusion

Limitations of these studies need to be a consideration in interpreting and generalize the findings of this study. The limitations of this study as following. Learning use the curriculum in 2013, the material used in the research is the subject matter in particular natural sciences Ecosystem material given in the second semester of fifth grade elementary school, in the process of synchronizing each

subject in connection with the material science into its own difficulties, so that conclusions given only applies to subjects on natural sciences. The existence of time constraints so that the learning process needs follow-up.

6. REFERENCES

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