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The Effectiveness Of Teams Games Tournament (Tgt) Learning Model And Make A Match Against Collaboration Ability On Science Content At Fifth Grade Elementary School-Meta Analysis

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ABSTRAK
Rendahnya kemampuan kolaboratif siswa, sehingga diperlukan model pembelajaran yang mampu mengembangkan kemampuan kolaboratif siswa. Tujuan penelitian ini adalah untuk menganalisis efektivitas model pembelajaran TGT dan *Make A Match* terhadap kemampuan kolaborasi pada muatan IPA kelas V SD. Jenis penelitian yang digunakan yaitu penelitian meta analisis. Subjek penelitian ini adalah model pembelajaran TGT dan *Make A Match* terhadap kemampuan kolaborasi. Teknik pengumpulan data yaitu dengan menganalisis 20 artikel dari jurnal elektronik melalui *google scholar*. Teknik analisis data yang digunakan adalah teknik analisis *effect size*. Hasil penelitian menunjukan bahwa dilihat dari uji *Anacova* nilai rata-rata skor eksperimen 2 model pembelajaran *Make A Match* sebesar 66.9760 lebih tinggi dibandingkan model pembelajaran TGT sebesar 53.0370. Sehingga dapat disimpulkan bahwa terdapat perbedaan yang signifikan dalam penggunaan model pembelajaran TGT dan *Make A Match* dalam kemampuan kolaborasi. Implikasi penelitian ini adalah dapat digunakan sebagai salah satu alternatif guru untuk mengembangkan sikap kerja sama, bisa berdiskusi dalam kelompok dan aktif dalam belajar.

ABSTRACT
Students' low collaborative ability, so a learning model that can develop students' collaborative abilities is needed. This study aimed to analyze the TGT learning model's effectiveness and Make A Match on collaborating on the science content of fifth-grade elementary school. The type of research used in meta-analysis research. The subject of this research is the TGT learning model and Make A Match on collaboration skills. The data collection technique is by analyzing 20 articles from electronic journals through google scholar. The data analysis technique used is the effect size analysis technique. The results showed that seen from the Anacova test, the mean score of the experimental two learning model Make A Match was 66.9760 higher than the TGT learning model of 53.0370. So it can be concluded that there are significant differences in the use of the TGT learning model and Make A Match in collaboration skills. This research implies that it can be used as an alternative for teachers to develop a cooperative attitude, discuss in groups and be active in learning.

1. Introduction

Education in the 21st century is a change for teachers and students when they play an important role when carrying out learning activities. Changes made for teachers and students, , students are required to be active in the learning process. Teachers experience changes in teaching methods using the learning model suggested by the 2013 curriculum. Students are also required to have 4C skills: Critical Thinking and Problem Solving, Communication, Collaboration, and Creativity, and innovation, which are skills aimed at 21st-century education (Jayadi et al., 2020; Mayasari et al., 2016). One of the 4C components that students need to have is collaboration skills. According to (Ambara et al., 2019; Mahendra et al., 2018), collaboration is joint involvement in a coordinated effort to solve problems collectively.

Based on school observations, it is seen that students still experience difficulties in learning science. At the same time, the teacher chooses a practical method dominated by lectures. In contrast, students imitate writing on the blackboard or in books. Science experiments or practicum are rarely carried out, so that students rarely do it. Discuss or cooperate with other friends. There are many science content theories so that the lecture method's application is considered more practical and efficient.

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Conventional learning that teachers often use is deemed no longer suitable for use because this method only emphasizes the teacher as the main source in transferring knowledge (Nopiandari, N. K., Rati, N. W., & Arini, 2016; Raharjo & Kristin, 2019).

One of the contents that can be seen from the cooperation ability is that science can be carried out by experimental or experimental activities or through a game. Student creativity in learning science is still lacking. Some students are just listeners as long as the teacher explains the lesson. Learning tends to reduce students' ability to work together (collaboration) in science learning in class. This condition, if allowed to continue, will have an impact on decreasing student activity and creativity. Science learning is learning based on principles that can foster students' scientific attitudes towards science concepts (Gathong & Chamrat, 2019; Setianingsih, 2019).

Learning success can be achieved by selecting and using appropriate learning models to absorb knowledge easily, make students active, don't get bored easily, foster curiosity, and stimulate students to develop their abilities (Cahyadi, 2016; Dewiyanti, 2018).

The learning model refers to an approach used, including learning objectives, the stages in a learning activity, the learning environment, and classroom management. (Gunarta, 2019; Murdika, 2018). The learning model can improve the classroom's learning quality, where students can work together (collaborate) with other friends. Teams Games Tournament (TGT) and Make A Match learning models in science content are deemed appropriate. Educators are expected to guide students' activities and potential in achieving learning objectives with a learning model following the concept. It needs to be done so that the quality of learning can be taken optimally at the subject's time. The learning model that researchers want to compare collaboration skills' effectiveness is between the Team Games Tournament (TGT) and the Make A Match learning model. Through collaboration (Collaborative), students can create a cooperative attitude, discuss in groups and be active in learning (Anggarawati et al., 2014; Masrita, 2017).

The Team Games Tournament (TGT) type learning model is a game model where students are divided into heterogeneous groups consisting of four or more students. (Cahyadi, 2016; Murdika, 2018). One learning model that can increase student activity in the classroom by working together is applying the Team Games Tournament (TGT) type of cooperative learning model. The TGT model is a learning model that can encourage students to construct their knowledge actively, apply and have the courage to convey their knowledge ideas, learn to solve problems, and discuss learning problems through games with other team members to get scores for their respective teams. (Dewiyanti, 2018; Mamanda, 2018).

Meanwhile, the Make A Match learning model is a conceptual approach that teaches students to understand concepts in an active, creative, interactive, effective, and fun way for students. The concepts are easy to understand and last a long time in the cognitive structure of students. (Saputra, 2017; Suatri, 2015). The Make A Match model is one of the models used as a game. In the Make A Match type learning model, learning occurs in groups with two group members. Each member of the group is not known beforehand but is searched based on its partner's similarity. Type Make A Match (looking for a partner) while learning a particular concept or topic in a fun atmosphere (Raharjo & Kristin, 2019; Wijanarko, 2017).

Several studies relevant to this research are research conducted by (1) (Dewiyanti, 2018), who obtained that the TGT learning model assisted by the snake and ladder game media affected mathematics learning outcomes. (2) (Gunarta, 2019), who obtained the research results that the TGT type of cooperative learning model assisted by question card media affected student learning outcomes. (3) (Saputra, 2017), who obtained research results using the Make A Match learning model, affects student learning outcomes.

The purpose of this study was to analyze the effectiveness of the team games tournament (TGT) learning model and Make A Match on the ability to collaborate on science content in fifth-grade elementary school.

2. Method

This type of research uses a meta-analysis method involving the results of previous studies. Meta-analysis is a study that quantitatively analyzes and summarizes some of the data from a pre-existing study (Aliyanti et al., 2019; Hafriani, 2019).

The subject of this research is the TGT learning model and Make A Match on collaboration skills. The purpose of this study was to analyze the effectiveness of the team games tournament (TGT) learning model and Make A Match on the ability to collaborate on science content in fifth-grade elementary school.

The data collection technique is by analyzing articles from electronic journals through google scholar. The initial step is to collect article data by searching for electronic journals. From the search results, 20 articles are relevant to this research.

The data analysis technique used is the effect size analysis technique. The effect size reflects the magnitude of the relationship between variables in each study. The choice of the effect size index depends on the type of data used in the study. This analysis technique analyzes the TGT learning model's effectiveness and Make A Match on students' collaboration abilities.

3. Result and Discussion

From the research results, there were articles obtained by 20 journals that match the research criteria. Article data is obtained by summarizing or comparing the TGT learning model and Make A Match. The comparison of the TGT learning model and Make A Match can be seen in Table 1.

Tabel 1. Presentase efektivitas terhadap kemampuan kolaborasi IPA Model pembelajaran TGT

Kode Data	Persentase (%)		
	Skor*Pretest*	Skor*Posttest*	Peningkatan
1P	71,30	82,35	11,05
2P	67,27	83,18	15,91
3P	20,08	28,79	8,71
4P	16,73	29,20	12,47
5P	78,22	93,18	14,96
6P	16,00	20,00	4,00
7P	18,21	22,96	4,75
8P	19,96	53,87	33,91
9P	66,04	75,03	8,99
10P	20,12	41,81	21,69
Rata-rata	**39,39**	**53,03**	**13,38**

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Based on the table above, it can be seen that the collaboration ability of the science content using the TGT learning model of the average percentage of pretest and posttest scores. The average percentage increase in collaboration skills on science content using the TGT learning model starts from the lowest, 4.00%, to the highest, 33.91%, with an overall average increase in collaboration ability of 13.38%. The average pretest percentage of 39.39% after applying the learning using the TGT model increased to 53.03%. The average score before using the TGT model and after using the TGT model has increased significantly by 13.38%, can be seen in Table 2.

Table 2. Effectiveness of the Collaborative Ability of Natural Science Learning Model Make A Match

Data	Percentage (%)		
	Pretest Score	*Posttest Score*	enhancement
1P	19,97	37,67	17,7
2P	19,44	99,79	80,35
3P	70,00	83,50	13,50
4P	63,00	75,00	12,00
5P	65,00	80,00	15,00
6P	76,00	80,00	4,00
7P	69,30	83,00	13,70
8P	19,96	53,87	33,91
9P	20,00	51,28	31,28
10P	15,9	25,65	9,75
Average	**43,85**	**66,97**	**23,00**

Based on the table above, it can be seen that the ability to collaborate on science content using the Make A Match learning model from the average percentage of pretest and posttest scores. The average percentage increase in the effectiveness of collaboration skills on science content, using the Make A Match learning model, starts from the lowest, 4.00%, to the highest, 80.35%, with an overall average increase in collaboration ability of 23.00%. The pretest percentage average of 43.85% after applying the Make A Match model increased to 66.97%. The average score before using the Make A Match model and after using the Make A Match model has increased significantly by 23.00%, can be seen in Table 3.

Table 3. Comparison of Collaboration Ability Measurement Results

Measurement	Average Score *(Mean)*		Difference
	TGT	Make A Match	
Pretest	39,39%	43,85%	4,46%
Posttest	53,03%	66,97%	13,94%

The comparative results of the measurement of collaboration ability show that the average percentage of the pretest score between the TGT learning model and Make A Match differs from 4.46%. The average percentage of posttest scores between the TGT learning model and Make A Match has a difference of 13.94%, as shown in Table 4.

Table 4. Normality Test of the TGT and Make A Match learning model

Tests of Normality							
	Class	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	Df	Sig.
Science Learning Outcomes	*Pretest Model TGT*	.246	10	.086	.856	10	.068
	Postest Model TGT	.201	10	.200*	.882	10	.139
	Pretest Make A Match	.248	10	.081	.861	10	.079
	Postest Make A Match	.233	10	.131	.921	10	.364

Based on Table 4, it is concluded that from the normality test of mathematics learning outcomes, the pretest and posttest scores from the TGT and Make A Match learning model can be described if a significance score is obtained> 0.05, the data is normally distributed and if the significance score is <0.05, the data is not distributed normally. The level of significance of the pretest score for the TGT learning model is 0.068> 0.05, which means that it is normally distributed. The significance level of the posttest score for the TGT learning model is 0.139> 0.05, which means that it is normally distributed. The Make A Match learning model's significance level is 0.079> 0.05, meaning it is normally distributed. The significance level of the posttest score for the Make A Match learning model is 0.364> 0.05, which means that it is normally distributed. To test the homogeneity of the TGT learning model's pretest score and Make A Match can be seen in Table 5.

Table 5. Homogeneity Test of the Pretest Score of the TGT Learning Model and Make A Match

Test of Homogeneity of Variance					
		Levene Statistic	df1	df2	Sig.
Science Learning Outcomes	*Based on Mean*	.012	1	18	.916
	Based on Median	.194	1	18	.665
	Based on Median and with adjusted df	.194	1	9.520	.670
	Based on trimmed mean	.001	1	18	.976

The table above shows the results of the homogeneity test through the Levene's Test method. Interpretation is done by determining one of the statistics, the statistic done by looking at the Based on Mean. The homogeneity score seen from the significance score of 0.916> 0.05 can be concluded that the TGT and Make A Match learning models have homogeneity or the same variations. The post-test score homogeneity test of the TGT learning model and Make A Match can be seen in Table 6.

Table 6. Homogeneity Test of the Posttest Score of the TGT Learning Model and Make A Match

Test of Homogeneity of Variance					
		Levene Statistic	**df1**	**df2**	**Sig.**
Science Learning	*Based on Mean*	.870	1	18	.363

Test of Homogeneity of Variance					
		Levene Statistic	**df1**	**df2**	**Sig.**
Outcomes	*Based on Median*	.829	1	18	.375
	Based on Median and with adjusted df	.829	1	16.313	.376
	Based on trimmed mean	.889	1	18	.358

The table above shows the homogeneity score seen from the significance score, 0.363> 0.05, which can be concluded that the TGT learning model and Make A Match have homogeneous variances. The linearity test of the pre-test and post-test scores of the TGT learning model can be seen in Table 7.

Table 7. Linearity test of the pre-test and post-test scores of the TGT Learning Model

ANOVA Table							
			Sum of Squares	***df***	***Mean Square***	***F***	***Sig.***
*Pos-test * Pre-test*	*Between Groups*	*(Combined)*	7303.372	8	912.922	27.488	.147
		Linearity	.335	1	.335	.010	.936
		Deviation from Linearity	7303.038	7	1043.291	31.414	.137
	Within Groups		33.211	1	33.211		
	Total		7336.583	9			

The table above shows the pretest and post-test linearity test results obtained a significance of 0.137> 0.05, which can be concluded that the pretest and post-test scores of the TGT learning model have a linear relationship. The linearity test of the pre-test and post-test scores of the model Make A Match can be seen in Table 8.

Table 8. Linearity test of the pre-test and post-test scores of the Make A Match model

ANOVA Table							
			Sum of Squares	***df***	***Mean Square***	***F***	***Sig.***
*Pos-test * Pre-test*	*Between Groups*	*(Combined)*	1799.359	8	224.920	1.005	.652
		Linearity	702.891	1	702.891	3.140	.327
		Deviation from Linearity	1096.468	7	156.638	.700	.729
	Within Groups		223.873	1	223.873		
	Total		2023.231	9			

The table above shows that the pre-test and post-test linearity results obtained a significance of 0.729> 0.05. The pre-test and post-test scores of the Make A Match learning model have a linear relationship. Analysis using the anacova test, can be seen in Table 9.

Table 9. Analysis Using Anacova Test

Descriptive Statistics			
Dependent Variable: Pos-test			
Model Pem	***Mean***	***Std. Deviation***	***N***
Model TGT	53.0370	28.16999	10
Model Make A Match	66.9760	23.55847	10
Total	**60.0065**	**26.26628**	**20**

Based on the analysis results using the ANCOVA test carried out on the TGT learning model, the number of articles was 10 with an average of 53.0370. Meanwhile, the Make A Match learning model with

the number of articles 10 has an average of 66.9760. So that from these results, there is a difference between the TGT learning model and Make A Match seen from the increase in collaboration skills in science content. The Make A Match learning model has higher results than the TGT learning model. The results of the anacova test analysis can be seen in Table 10.

Table 10. Anacova Test Analysis Results

Tests of Between-Subjects Effects						
Dependent Variable: Pos-test						
Source	***Type III Sum of Squares***	***Df***	***Mean Square***	***F***	***Sig.***	***Partial Eta Squared***
Corrected Model	971.479[a]	1	971.479	1.441	.246	.074
Intercept	72015.601	1	72015.601	106.805	.000	.856
Model_Pem	971.479	1	971.479	1.441	.246	.074
Error	12136.948	18	674.275			
Total	85124.028	20				
Corrected Total	13108.427	19				
a. R Squared = .074 (Adjusted R Squared = .023)						

Based on the ANCOVA test results located in the learning model column above, it can be concluded that the significance in the Sig. A total of 0.246. The calculated F obtained is 1.441 and the F table from the data acquisition above is 3.55. The effect size test using the Anacova test can be seen in Table 11.

Table 11. Effect Size Test using Anacova Test

Tests of Between-Subjects Effects						
Dependent Variable: Pos-test						
Source	***Type III Sum of Squares***	***Df***	***Mean Square***	***F***	***Sig.***	***Partial Eta Squared***
Corrected Model	971.479[a]	1	971.479	1.441	.246	.074
Intercept	72015.601	1	72015.601	106.805	.000	.856
Model_Pem	971.479	1	971.479	1.441	.246	.074
Error	12136.948	18	674.275			
Total	85124.028	20				
Corrected Total	13108.427	19				
a. R Squared = .074 (Adjusted R Squared = .023)						

Based on the table above, performing the Effect size test using the Ancova test using the TGT learning model and Make A Match, there are results in the Corrected Model column known to be Partial Eta Squared of 0.047 with a Sig score. equal to 0.246. It shows that the TGT and Make A Match learning models have a major influence on elementary School science content's collaboration ability

This research was conducted to determine whether there is a difference in the improvement of collaboration skills in science content between the TGT and Make A Match learning models. This research uses meta-analysis. The initial step is to collect article data through searching for electronic journals. From the search results, there are 20 relevant articles.

There is an increase in the ability to collaborate in Elementary School science content with the TGT learning model starting from the lowest, 4.00%, to the highest, 33.91%. The average percentage of 39.39% after applying to learn using the TGT model increased to 53.03 %. The average score before using the TGT model and after using the TGT model experienced a significant increase of 13.38%.

Increasing collaboration skills on science content uses the Make A Match learning model starting from the lowest, 4.00%, to the highest, 80.35%. The average percentage of 43.85% after applying the Make A Match model increased to 66.97%. Before using the Make A Match model and after using the Make A Match model, the average score has a significant increase of 23.00%.

From the results of the Anacova test for the TGT and Make A Match learning model, it was obtained that the partial eta square score was 0.74, which means that the two learning models had a moderate effect on the collaboration ability of Elementary School science content. From the Ancova test results for the TGT and Make A Match learning model, the mean difference score of the TGT learning

model was 53.0370. The mean difference score of the Make A Match learning model was 66.9760. It means that the Make A Match model is higher than the TGT learning model, with a difference of 13.939.

Research is a scientific activity that is based on a problem. Then a method is determined to find a solution. This study uses two learning models, TGT and Make A Match. In this study, most of the articles taken and analyzed were quasi-experimental research. The researcher could not control the possibility of other variables involved. Because the meta-analysis invites many samples and many methodologies or the statistical framework used, there is a possibility of biased data. (Maharani, 2017; Suryaman, 2015). The collection of articles that meet the criteria is 20 articles in this study.

The learning model refers to an approach used, including learning objectives, the stages in a learning activity, the learning environment, and classroom management. (Gunarta, 2019; Murdika, 2018). The learning model can improve the classroom quality in the classroom, where students can work together (collaborate) with other friends. Teams Games Tournament (TGT) and Make A Match learning models in science content are deemed appropriate. Educators are expected to guide students' activities and potential in achieving learning objectives with a learning model following the concept. It needs to be done so that the quality of learning can be taken optimally at the subject's time. The learning model that researchers want to compare collaboration skills' effectiveness is between the Team Games Tournament (TGT) and Make A Match learning model. Through collaboration (Collaborative), students can create a cooperative attitude, discuss in groups and be active in learning.

The Team Games Tournament (TGT) type learning model is one of the game models in which students are divided heterogeneously into groups of four or more students. One learning model that can increase student activity in the classroom by working together is applying the Team Games Tournament (TGT) type of cooperative learning model. The TGT model is a learning model that can encourage students to construct their knowledge actively, apply and have the courage to convey their knowledge ideas, learn to solve problems, and discuss learning problems through games with other team members to get scores for their respective teams. (Dewiyanti, 2018; Mamanda, 2018).

Meanwhile, the Make A Match learning model is a conceptual approach that teaches students to understand concepts in an active, creative, interactive, effective and fun way for students. The concepts are easy to understand and last a long time in students' cognitive structure (Saputra, 2017; Suatri, 2015). The Make A Match model is a model that is used as a game or used as a game. In the Make A Match type learning model, learning occurs in groups, with two group members. Each group member is not known beforehand but is searched based on its partner's similarity. Make A Match (looking for a partner) while learning a particular concept or topic in a fun atmosphere (Raharjo & Kristin, 2019; Wijanarko, 2017).

Several studies relevant to this research are research conducted by: (1) (Dewiyanti, 2018), who obtained the results of the study that the TGT learning model assisted by the snake and ladder game media affected mathematics learning outcomes. (2) (Gunarta, 2019), who obtained the research results that the TGT type of cooperative learning model assisted by question card media affected student learning outcomes. (3) (Saputra, 2017), who obtained research results using the Make A Match learning model affects student learning outcomes.

This research implies that it can be used as an alternative for teachers to develop a cooperative attitude, discuss in groups and be active in learning. This study also has limitations. The results presented can be used as a reference for applying the TGT and Make A Match learning model to the ability of Elementary School science collaboration.

4. Conclusion

Based on the results of the research and discussion that has been described, it can be concluded that the Make A Match learning model is more successful or effective if it is compared with the TGT learning model on the collaboration ability of Elementary School science content. This research implies that it can be used as an alternative for teachers to develop a cooperative attitude, discuss in groups and be active in learning.

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