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The Effect of Teams Games Tournament Method Assisted by Card Sort Media to Improve Student Creative Thinking Skill

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ABSTRACT

This research aims to determine the influence of the Teams Game Tournament (TGT) method, assisted by card sort media, on enhancing creative thinking skills among fourth-grade students. The research design employed in this study is a quasi-experimental design with a pre-test and post-test design. The research was conducted at SDN 15 Mataram, with a population of 40 fourth-grade students from two classes, consisting of 20 students in each class. The researchers used random sampling to select the experimental group and the control group, drawing lots conducted by the class teacher using a lottery system. Data collection methods in this study involved both test and non-test techniques. Based on the results of the data analysis, it can be concluded that the t-test result (t-value) is 8.692, while the t-table value is 2.042. Since the t-value is greater than the t-table value (t-value > t-table), the null hypothesis is rejected, and the alternative hypothesis is accepted. This indicates that the cooperative learning model of the make-a-match type can improve creative thinking skills among fourth-grade students.

Keywords: cooperative learning, creative thinking skills, game tournament, natural science

INTRODUCTION

Teachers play a pivotal role in the educational system as they bear the responsibility of imparting knowledge to students. The education landscape in Indonesia undergoes periodic changes, notably in the application of curricula. The levels of primary and secondary education currently adhere to the Curriculum 2013 (K-13) [1]. The incorporation of K-13 in the educational process aims to prioritize student-centered learning. This approach emphasizes active student involvement, with teachers assuming the role of facilitators [2]. For the learning process in the classroom to be effective, teachers must possess a comprehensive understanding of the materials they convey to students. This necessity is further reinforced by the proficiency of teachers in classroom management and the utilization of appropriate teaching

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methodologies. According to Ref. [3], the learning process can amalgamate various models and approaches to create an environment centered around students. Learning models serve as invaluable tools for instructional designers and teachers in the planning of teaching and learning activities.

During the primary school years, the cognitive abilities of children for creative thinking undergo significant development. Creative thinking skills do not naturally evolve; they require guidance from others to develop flexible, original, and detailed thinking skills [4]. Therefore, it is paramount for educators in the realm of formal primary school education to foster the growth of students' creative thinking abilities. The effort to nurture creative thinking skills involves two main components: teachers and students. Effective communication and collaboration between teachers and students are crucial for the achievement of learning objectives [5]. Students are expected to play a more active role in the learning process compared to teachers to facilitate effective learning [6]. Students need to articulate their opinions effectively, not only to comprehend the information provided by teachers but also to expand upon it further [7].

Creative thinking holds immense importance in contemporary society as it enhances individual adaptability, openness, and problem-solving skills. A sought-after trait in the professional world is the ability to think creatively [8]. Key characteristics in the work environment include Confidence: (demonstrating a sense of self-assurance), Strong Motivation for Success and Achievement (possessing a robust drive for success), Development of Fundamental Skills (mastery of basic skills such as reading, writing, listening, speaking, and computer literacy), Cultivation of Strong Thinking Abilities (encompassing questioning skills, decision-making, analytical thinking, and creative thinking), and Development of Effective Interpersonal Skills (cultivating effective interpersonal skills, including collaboration and negotiation abilities). Students equipped with these skills have a promising future.

Based on the researcher's findings in the fourth-grade classroom at SDN 15 Mataram, it was identified that students' creative thinking abilities are relatively low and challenging to apply, particularly in the subject of Science. In the realm of education, it appears that teachers may have neglected to adequately prepare students to respond to questions that require creative thinking skills. There is a deficiency in students' capacity for creative thinking, specifically in generating new ideas. Students must nurture their abilities to produce ideas, solutions, and unique expressions, and to develop and refine their ideas. Moreover, students' responses often lack variety and originality. Their answers are less fluent and flexible, as many students tend

to rely on information rather than providing their insights. Many individuals are prone to imitating the thought processes of their brighter peers rather than exploring their ideas. They frequently seek explanations and guidance from teachers.

The deficiency in students' creative thinking abilities during the learning process is attributed to the lack of creativity in the application of teaching strategies by educators. For a teacher, creativity in teaching is a fundamental asset in fostering students' proficiency in comprehending the knowledge being imparted. The consequences of the low creative thinking skills of students during the learning process necessitate educators to implement teaching models that can enhance students' creative thinking abilities. Therefore, educators should employ teaching models that can train and instill a habit in students to elevate their creative thinking skills in the classroom.

In conclusion, the analysis above indicates that fourth-grade students at SDN 15 Mataram exhibit a low level of creative thinking skills, particularly in the context of science learning. This observation forms the basis for conducting research aimed at improving the deficient creative thinking skills in the context of Science education. The chosen intervention involves implementing the Cooperative Learning model, specifically the TGT approach. This model is selected due to its tailored focus on enhancing students' creative thinking abilities, and providing opportunities for active engagement in the learning process, both individually and within social groups. Moreover, it involves students taking on roles as tutors and encompasses elements of both learning and playing.

TGT is an educational approach that underscores collaboration among students within groups to achieve learning objectives. When employing the cooperative learning model, the teacher assumes the role of a motivator and facilitator rather than a passive information provider. Students are allowed to articulate their ideas clearly and concisely. They are encouraged to generate novel ideas and employ creative problem-solving methods distinct from existing ones. The Cooperative Learning model TGT aims to enhance students' creative thinking skills by enabling them to effectively solve problems with depth, fluency, and originality, as recommended by researchers.

The specific form of Cooperative Learning known as proven highly suitable for science education. Science is intricately connected to our surroundings, and TGT Cooperative Learning can effectively address issues that arise in our daily lives. This cooperative learning approach involves all students, irrespective of their social status, engaging them in various activities. It

emphasizes the role of students as tutors and integrates elements of both learning and play. Students are allowed to articulate their ideas clearly and succinctly. They are motivated to generate new ideas, fostering creativity in problem-solving by offering fresh perspectives. The implementation of the Cooperative Learning model aims to enhance students' creative thinking skills by enabling them to solve problems effectively and innovatively, as suggested by researchers.

Based on the aforementioned considerations, the researcher is inclined to conduct a study on The Influence of the TGT Learning Model Assisted by Card Sort Media on Improving Creative Thinking Abilities in Energy Materials for Fourth-Grade Students at SDN 15 MATARAM.

METHODS

This study employs a quasi-experimental quantitative methodology, utilizing a pretest-posttest control group design. In his work, Creswell (2014) explains the purpose of quasi-experiments in establishing cause-and-effect relationships. The experiment involves both a control group and an experimental group. The research utilizes a non-equivalent control group design. The study is conducted with two different groups: the experimental group and the control group. The experimental group in this research undergoes treatment through the implementation of the TGT cooperative learning model. In contrast, the control group employs the STAD (Student Teams Achievement Division) cooperative learning method.

RESULTS AND DISCUSSION

This study is an experimental research aimed at investigating the effects of implementing the TGT cooperative learning model in the fourth-grade class at SD Negeri 15 Mataram. Data collection in this research involves observation, tests, and documentation. Observations are made to assess the implementation of the TGT cooperative learning model, while tests are conducted to evaluate creative thinking skills in science, specifically on the topic of Energy, using essay-type questions. Documentation serves as evidence that the research has been conducted using the TGT cooperative learning model.

The research was carried out with fourth-grade students at SDN 15 Mataram from November 9 to November 16, 2023. The experimental group (Class IV B) was subjected to the TGT cooperative learning model, while the control group (Class IV A) received planned treatment. Before implementing the different treatments, both groups underwent pre-tests and

post-tests, consisting of 10 essay questions. The obtained results from pre-tests and post-tests were then analyzed using SPSS version 21 for Windows.

The treatment involved the use of an observation sheet to assess the feasibility of cooperative learning. The treatment was implemented by applying the TGT cooperative learning model. In this scenario, the researcher assumed the role of the instructor, while a fellow researcher served as the observer. The results of the observations on the treatment provided to both the experimental and control groups, consisting of a total of 40 students, are presented in Table 1.

Table 1. Feasibility Results of the TGT Cooperative Learning Model and the STAD Cooperative Learning Model

Group	Session	Percentage (%)	Criteria
Experimental Group	1	90%	Excellent
Control Group	2	87%	Good

Based on the provided table, it is evident that the implementation of both the TGT (Time Games Tournament) and STAD (Student Teams Achievement Divisions) cooperative learning models has been successful. The initial session of the experimental class on November 9, 2023, showcased impressive results with a score of 90. Subsequent meetings in both the experimental and control classes, held as planned on November 13, 2023, were executed effectively, resulting in a score of 87 for the control class. This positive outcome can be attributed to the instructor's meticulous execution of all core activities associated with the TGT cooperative learning model.

Table 2. Results of Instrument Validity Test

Item No	R_{table}	R_{count}	Remark
1	0.227	0.367	Valid
2	0.227	-	Not Valid
3	0.227	0.533	Valid
4	0.227	0.533	Valid
5	0.227	0.381	Valid
6	0.227	0.629	Valid
7	0.227	0.301	Valid
8	0.227	0.474	Valid
9	0.227	0.865	Valid
10	0.227	0.520	Valid

Based on the findings from Table 2, the assessment of students' creative thinking skills in science involved the calculation of test instrument validity. This assessment comprised 10 essay questions with 20 respondents, and the analysis was carried out using SPSS 21 for Windows. The critical value (Rtable) was determined to be 0.227, leading to the identification of 9 valid questions and 1 question deemed invalid. This indicates that one question is unsuitable for testing. The validated questions, specifically numbers 1, 3, 4, 5, 6, 7, 8, 9, and

10, meet the criteria for further research. The detailed calculations for question validation can be found in the appendix.

The results from Table 3 reveal that the reliability test yielded a Cronbach's Alpha value of 0.438. This suggests that the instrument employed in the study is reliable, and the questions demonstrate consistent reliability. The alpha coefficient value, surpassing 0.05, provides additional support for the instrument's reliability and suitability for research purposes.

Table 3. Difficulty Level Test Results

		Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	Question 9
N	Valid	20	20	20	20	20	20	20	20	20
	Missing	0	0	0	0	0	0	0	0	0
Mean		3.90	3.90	3.90	3.75	3.05	3.45	2.65	3.90	3.25
Maximum		4	4	4	4	4	4	4	4	4

Based on the presented table, the difficulty level calculations yield the following results: there are no questions categorized as difficult, 8 questions classified as easy, and 1 question classified as moderate.

Table 4. Differential Item Analysis Results Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
P1	27.85	4.029	.230	.406
P2	27.85	3.608	.353	.353
P3	27.85	3.608	.353	.353
P4	28.00	3.895	.180	.411
P5	28.70	2.853	.256	.380
P6	28.30	4.011	-.027	.510
P7	29.10	3.674	.264	.380
P8	27.85	4.450	-.105	.476
P9	28.50	3.421	.245	.380

Based on Table 4 above, the item discrimination calculations reveal that 1 question meets the excellent criteria, 6 questions meet the satisfactory criteria, and 2 questions exhibit negative criteria, indicating that they should be discarded.

Table 5 is evident that the creative thinking abilities of students in the control class (Grade IV B, SDN 15 Mataram) varied, with the highest pretest score at 70 and the lowest at 52. The pretest's average score was 61.75. In the posttest, the highest score was 75, the lowest was 60, and the average score was 68.1. These assessments were made before the implementation of the TGT model. Consequently, it can be concluded that the use of the STAD cooperative learning method in the control class was less effective in enhancing students' creative thinking abilities in the context of science, specifically the topic of energy in Grade IV at SDN 15 Mataram.

Table 5. Pre-test and Post-test Results for the Control Class

No.	Student's Name	Pretest	Posttest
1.	SF	57	72
2.	LIR	60	72
3.	BUS	67	77
4.	MOS	62	75
5.	PRA	60	80
6.	KGP	70	70
7.	NMCS	65	72
8.	FH	60	65
9.	MA	65	70
10.	AP	57	75
11.	MHH	67	78
12.	IKRA	52	62
13.	IMAB	57	67
14.	IWRA	60	70
15.	AR	55	70
16.	MDY	62	70
17.	PSBF	55	76
18.	BA	65	77
19.	KARS	67	72
20.	LFR	67	70
	Total Score	1,235	1,362
	Mean	61.75	68.1
	Highest Score	70	75
	Lowest Score	52	60

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From the presented data in Table 6, it is evident that the creative thinking abilities of students in the experimental class (Grade IV A, SDN 15 Mataram) exhibited a range of scores. The highest pretest score was 87, and the lowest was 67, with an average of 79.35. Following the implementation of the TGT, the post-test scores ranged from 80 to 97, with an average of 84.62. Therefore, it can be concluded that the use of the TGT model in the experimental class had a significant impact on enhancing students' creative thinking abilities in the context of science, specifically in the area of energy for Grade IV at SDN 15 Mataram.

The table presents the results of the normality test, particularly focusing on the Kolmogorov-Smirnov column. The experimental pre-test class, experimental post-test class, control pre-test class, and sham post-test class all have significance levels greater than 0.05 at a 5% significance level. According to the testing criteria, if the obtained significance is greater than 0.05, it indicates that the data follows a normal distribution. However, there is a viewpoint suggesting that the data may not adhere to a normal distribution if the obtained significance is less than 0.05.

Table 6. Pre-test and Post-test Results for the Experimental Class

No	Student's Name	Pretest	Posttest
1.	RAS	77	87
2.	QYH	80	90
3.	HB	85	95
4.	ALB	70	80
5.	SAF	80	90

No	Student's Name	Pretest	Posttest
6.	ASA	77	87
7.	DAF	75	85
8.	WDA	77	87
9.	NR	75	85
10.	IMBW	67	77
11.	RMK	80	90
12.	TASS	77	87
13.	S	77	87
14.	NPGDTD	82	92
15.	NPUP	87	97
16.	BS	85	95
17.	IND	85	95
18.	IMRAD	85	95
19.	KHFAZ	77	87
20.	RS	85	95
	Total Score	1,587.5	1,692
	Mean	79.35	84.62
	Highest Score	87	97
	Lowest Score	67	80

Table 7. Normality Test Results

	Class	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	Df	Sig.
Creative Thinking Ability	Experiment	.178	20	.098	.958	20	.509
	Control	.208	20	.024	.887	20	.023

a. Lilliefors Significance Correction

Based on Table 8, the significance value (Sig.) for creative thinking is found to be 0.859. This implies that the value is > 0.05, leading to the conclusion that the variances of pre-test and post-test data, as well as the creative thinking ability between the experimental and control classes, are equal or homogeneous. Consequently, the data is deemed suitable for use.

Table 8. Homogeneity Test Results

		Levene Statistic	df1	df2	Sig.
Creative Thinking Ability	Based on Mean	.032	1	38	.859
	Based on Median	.112	1	38	.739
	Based on the Median and with adjusted df	.112	1	37.996	.739
	Based on trimmed mean	.049	1	38	.825

Upon reviewing the provided hypothesis test results, it is crucial to note that the data demonstrates normal distribution and homogeneity. Therefore, special consideration should be given to the concept of equal variance, which is assumed for hypothesis determination. To establish the hypothesis, the calculated t-value of 8.692 can be compared with a significance level of 0.000. The search for the t-table value is conducted at a 5% significance level with degrees of freedom (df) equal to n-2, or 40-2, resulting in 38. With a two-tailed test (significance level - 0.05), the obtained t-table value is 2.042.

Table 9. Independent Sample T-Test Results

Class	Creative Thinking Ability	Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Experiment	Equal variances assumed	.032	.859	-8.692	38	.000	-11.600	1.335	-14.302	-8.898
Control	Equal variances not assumed			-8.692	38	.000	-11.600	1.335	-14.303	-8.897

Since the calculated t-value is greater than the t-table value, the alternative hypothesis (Ha) is accepted, and the null hypothesis (Ho) is rejected. Thus, following the fundamental decision-making rule in independent sample t-tests, it can be concluded that there is an influence of the cooperative learning model of the TGT type on the creative thinking abilities of fourth-grade students in the context of energy-related science lessons at SDN 15 Mataram.

DISCUSSION

Ref. [9] found that through learning media, teachers can develop more interactive and engaging learning media, facilitating a more effective teaching and learning process. Additionally, the use of the TGT learning model supported by image media has also proven to have a positive impact on student learning outcomes. The study conducted by Ref. [10] demonstrated that the implementation of the TGT model enhances students' understanding of the material being taught. Furthermore, Ref. [11] emphasized the importance of higher-order thinking skills in the learning process, which can be achieved through appropriate teaching methods. Ref. [12] also revealed that the use of audiovisual media in the TGT cooperative learning model can improve students' learning outcomes in science subjects. Overall, the combination of various approaches and learning media can create a more dynamic and effective learning environment, thereby supporting the achievement of optimal learning outcomes.

The implementation of cooperative learning models supported by various media types has shown significant impacts on student learning outcomes across different educational settings. Ref. [13] conducted a study on the TGT cooperative learning model assisted by crossword puzzle media, revealing positive effects on student academic achievements. This approach enhances student engagement and collaboration, thereby improving their understanding and retention of the material. Similarly, Ref. [14] explored the integration of problem-based learning with high-order thinking skills, emphasizing its influence on critical thinking abilities and self-confidence among students. These findings underscore the

importance of innovative teaching methodologies that not only enhance academic performance but also foster essential cognitive and affective skills crucial for lifelong learning.

Problem-based learning has been widely recognized as a powerful approach to enhancing high-level mathematical thinking skills among middle school students. Ref. [15] discusses the effectiveness of problem-based learning in improving students' ability to tackle complex mathematical problems, thereby promoting deeper understanding and application of mathematical concepts. Similarly, Ref. [16] compared the academic achievements of eighth-grade students using cooperative learning models such as Student Team Achievement Division (STAD) and Numbered Head Together (NHT) in Cartesian coordinate system subjects. Their findings highlight the significant impact of cooperative learning on student learning outcomes, emphasizing its role in enhancing collaborative skills and academic performance. Moreover, Ref. [17] emphasizes the importance of innovative teaching methods in instilling character values among elementary school students. Their meta-synthesis study underscores the role of innovative and character-based learning approaches in nurturing well-rounded individuals capable of contributing positively to society.

CONCLUSION

Based on the findings and analysis of this study, it is evident that the cooperative learning model TGT significantly enhances the creative thinking abilities of fourth-grade students in the context of learning about energy change. This instructional method promotes active participation among students, facilitating the expression of ideas and fostering creative problem-solving skills. By engaging with open-ended challenges and exploring diverse solutions, students are encouraged to think freely and creatively, thereby developing higher-order cognitive abilities. These conclusions are robustly supported by statistical analysis, where the calculated t-value of 8.692 exceeds the critical t-table value of 2.042 at a 5% significance level, leading to the rejection of the null hypothesis (H0).

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