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THE EFFECT OF USING THE TEAM GAMES TOURNAMENT TYPE COOPERATIVE MODEL USING CHAIN QUESTION CARD MEDIA ON MATHEMATICS LEARNING IN GRADE V STATE ELEMENTARY SCHOOL 102/II SUNGAI KERJAN

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Abstract

This research was motivated by the low mathematics learning outcomes of fifth-grade students at SD Negeri 102/II Sungai Kerjan. As many as 46% of students had not achieved the Learning Objective Completion Criteria (KKTP), indicating the need for the implementation of innovative and enjoyable learning models. The purpose of this study was to determine the effect of using chained question cards in the Team Games Tournament (TGT) cooperative learning model on students' mathematics learning outcomes. This study used a quantitative approach with a quasi-experimental method and a Nonequivalent Control Group Design. The study sample consisted of two classes: an experimental class of 26 students who received the TGT model using chained question cards, and a control class of 24 students who were taught conventionally. The instruments used were pre-tests and post-tests. Data were analyzed using the non-parametric Mann-Whitney test because the data were not normally distributed. The analysis showed a significant difference between the post-test scores of students in the experimental and control classes. The average learning outcomes of students in the experimental class were higher than those in the control class. The hypothesis test showed a significance value (p-value) <0.05, thus the null hypothesis (Ho) was rejected and the alternative hypothesis (Ha) was accepted. Thus, it can be concluded that the use of chained question cards in the Team Games Tournament (TGT) cooperative learning model significantly improved fifth-grade students' mathematics learning outcomes..

Keywords: team games tournament (TGT), chained question cards, mathematics learning outcomes, cooperative learning.

Abstrak

Penelitian ini dilatarbelakangi oleh rendahnya hasil belajar matematika siswa kelas V di SD Negeri 102/II Sungai Kerjan. Sebanyak 46% siswa belum mencapai nilai Kriteria Ketuntasan Tujuan Pembelajaran (KKTP), yang mengindikasikan perlunya penerapan model pembelajaran yang inovatif dan menyenangkan. Tujuan dari penelitian ini adalah untuk mengetahui pengaruh penggunaan media kartu soal berantai dalam model pembelajaran kooperatif tipe Team Games Tournament (TGT) terhadap hasil belajar matematika siswa. Penelitian ini menggunakan pendekatan kuantitatif dengan metode kuasi eksperimen dan desain Nonequivalent Control Group Design. Sampel penelitian terdiri atas dua kelas: kelas eksperimen sebanyak 26 siswa yang mendapatkan perlakuan model TGT berbantu media kartu soal beratai, dan kelas kontrol sebanyak 24 siswa yang diajar secara konvensional. Instrumen yang digunakan berupa tes pre-test dan post-test. Data dianalisis menggunakan uji non-parametrik Mann-Whitney karena data tidak berdistribusi normal. Hasil analisis menunjukkan bahwa terdapat perbedaan yang signifikan antara nilai post-test siswa di kelas eksperimen dan kelas kontrol. Nilai rata-rata hasil belajar siswa di kelas eksperimen lebih tinggi dibandingkan kelas kontrol. Uji hipotesis menunjukkan nilai signifikansi (p-value) < 0,05, sehingga hipotesis nol (Ho) ditolak dan hipotesis alternatif (Ha) diterima. Dengan demikian, dapat disimpulkan bahwa penggunaan media kartu soal berantai dalam model pembelajaran kooperatif tipe Team Games Tournament (TGT) berpengaruh signifikan terhadap peningkatan hasil belajar matematika siswa kelas V..

Kata kunci: team games tournament (TGT), media kartu soal berantai, hasil belajar matematika, pembelajaran kooperatif.

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INTRODUCTION

Mathematics is a subject that plays a crucial role in developing students' logical, critical, analytical, and systematic thinking skills. This competency not only provides a foundation for studying other disciplines but also serves as a crucial asset in facing 21st-century challenges that demand higher-order thinking skills (HOTS) and complex problem-solving abilities (Putri, A. R., & Hidayat, 2023). According to (Sari, 2024), mastering mathematical concepts from elementary school helps students develop structured thinking patterns, trains analytical skills, and increases their confidence in solving everyday problems.

However, in practice, mathematics learning is often perceived as difficult, abstract, boring, and even frightening for some students. This perception results in low student interest, motivation, and learning outcomes (Dewi, L. S., & Kurniawan, 2022). A similar situation occurred at SD Negeri 102/II Sungai Kerjan, where pre-test results showed that 46% of fifth-grade students had not achieved the Learning Objective Completion Criteria (KKTP) with a minimum score of 70. This achievement demonstrates the need for innovation in learning models and media that can encourage active student engagement and facilitate conceptual understanding.

Based on Vygotsky's social constructivism theory, effective learning occurs when students are actively engaged in the learning process through social interaction, collaboration, and teacher guidance within the Zone of Proximal Development (ZPD) (Santrock, 2020). The cooperative learning model emphasizes cooperation, shared responsibility, and active participation of the entire group (Slavin, 2020).

One cooperative learning model that has proven effective is the Team Game Tournament (TGT). According to Slavin (2020), TGT combines group discussions with academic competitions based on educational games, thereby increasing students' motivation and self-confidence. Ardian (2021) found that implementing TGT in mathematics learning significantly improved students' learning outcomes, engagement, and positive attitudes toward the subject. These findings are supported by Sitanggang, S.P., Harefa, N., & Panjaitan (2024), who reported that TGT is effective in improving students' conceptual understanding and active participation in elementary schools.

To optimize the implementation of TGT, learning media are needed that can activate students and facilitate gradual conceptual understanding. One suitable medium is a chain

question card, which presents a series of logically interconnected questions (Lubis, M. S., & Rahmawati, 2023). This media helps students understand the material sequentially, trains critical thinking skills, and builds connections between concepts (Fitriah, 2020). Furthermore, chain question cards also strengthen group collaboration because each member has a role in solving different parts of the problem.

Recent studies have shown that combining the TGT model and chained question cards can improve students' mathematics abilities. (Sari, 2024) found that this media can improve students' understanding of number operations and encourage them to participate actively. Meanwhile, (Amalia, S., & Rahman, 2021) found that the use of interactive card-based media significantly increased students' desire to learn and their learning outcomes. (Pasinggi, R., Situmeang, R., & Yusuf, 2024) showed that using game media such as question cards makes learning fun, competitive, and interactive.

Arsyad (2021) states that good learning media should arouse student interest, clarify information, and facilitate student understanding. This theory aligns with the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek, 2022), which recommends the use of creative media as part of the Independent Curriculum implementation to encourage active, cooperative, and contextual learning.

This study aims to examine how the use of chained question cards in the TGT cooperative learning model improves the mathematics learning outcomes of fifth-grade students at SD Negeri 102/II Sungai Kerjan. This study is based on theory, expert opinion, and relevant research findings.

METHODS

This study employed a quantitative approach with a quasi-experimental method and an Unequal Control Group Design. This design involved two randomly selected groups: an experimental group and a control group.

The experimental group consisted of 26 students from class VA who participated in a cooperative learning program through a Team Games Tournament (TGT) using chained question cards. Meanwhile, the control group consisted of 24 students from class VB who implemented a conventional learning method (lecture).

The instrument used in this study was a learning achievement test consisting of a pre-test and post-test on the topic of rectangles. The instrument's validity and reliability were tested before use. Learning outcome data were analyzed using the non-parametric Mann-Whitney test because the data were not normally distributed.

RESULTS AND DISCUSSION

Data collection in this study involved a mathematics learning achievement test consisting of a pre-test and a post-test. These tests were administered to two sample groups: the experimental group and the control group. The pre-test was used to determine students' initial abilities before receiving the treatment, while the post-test was used to determine improvements in learning outcomes after the treatment.

The test instrument underwent validity and reliability testing. Item validity was tested using the product-moment correlation technique, while reliability was tested using the Cronbach's Alpha formula. The instrument was also analyzed based on the level of difficulty and discriminatory power of the items to ensure that the items used were truly appropriate and capable of accurately measuring learning outcomes.

Data analysis in this study began with prerequisite tests, namely normality and homogeneity tests. The results of the normality test indicated that the data were not normally distributed, so inferential analysis was conducted using the non-parametric Mann-Whitney U test.

The Mann-Whitney test was used to determine whether there was a significant difference in mathematics learning outcomes between students taught using the Team Games Tournament learning model with the aid of chained question cards and students taught using conventional methods. The following are the results of the comparison of the average pre-test and post-test scores:

Group	Pre-test Average	Post-test Average
Experimen	63,12	82,88
Control	61,25	75,42

The table above shows that there was an improvement in learning outcomes in both groups. However, the most significant improvement occurred in the experimental group. This indicates that the use of chained question cards in the TGT model is more effective in improving students' mathematics learning outcomes.

The results were interpreted by comparing the significance value (p-value) with the 0.05 level of significance. If $p < 0.05$, H_o is rejected and H_a is accepted, indicating a significant effect of the treatment on student learning outcomes

The data description in this study includes the pre-test and post-test results of two groups: the experimental class and the control class. The pre-test was administered before the treatment to determine students' initial abilities, while the post-test was administered after the learning process to measure final learning outcomes.

Before the treatment was administered to both classes, students were first given a pre-test to compare their scores before and after the treatment. The summary of student scores is shown in the table below:

Table 4.1
Pre-test and Post-test Results of Experimental and Control Classes

No	Student Name 5A (Experimental Class)	Gender	*Pre-test* Scores	*Post-test* Scores	Student Name 5B (Control Class)	Gender	*Pre-test* Scores	*Post-test* Scores
1.	IMK	P	74	69	AA	P	62	62
2.	N	L	0	0	AQ	P	33	40
3.	BA	P	79	45	AN	L	15	24
4.	R	P	38	89	A	P	51	69
5.	NQL	P	52	85	MR	L	26	20
6.	N A	P	59	50	B	P	33	64
7.	KS	P	39	71	KS	L	48	15
8.	Q	P	43	43	RTNP	L	36	31
9.	CR	P	6	14	H	L	17	14
10.	AA	P	69	56	MH	L	36	21
11.	MZA	L	58	58	FAL	P	34	51
12.	KA	P	65	88	JKY	L	23	37
13.	G	L	37	-	DNR	P	43	27
14.	BS	L	75	-	SAR	P	32	44
15.	DZP	P	79	79	AK	L	25	-
16.	GI	P	91	93	DAR	L	42	10
17.	Z	L	34	28	IAS	P	45	32
18.	IL	P	78	27	EER	L	24	13
19.	NNA	P	92	93	AKI	P	55	63
20.	AI	P	61	50	YH	L	50	19
21.	AR	L	79	55	K	P	26	35
22.	AA	L	63	54	MFA	L	-	17
23.	A	L	-	43	SN	P	-	39

24.	K	L	-	26	I	P	-	20
25.	J	L	-	24				
Average			58	54	Average		36	34

Source: Research Data 2025

Based on the analysis of table 4.1 above, the results of the pre-test and post-test in the experimental class and control class, the average value data obtained are as follows:

Table 4.2
Average Pre-test and Post-test Scores for the Experimental and Control Classes

		Experimental Classes	Control Classes
Number of Students		25	24
Average Value	*Pre-test*	58	36
	Post-test	54	34

In table 4.2, the average post-test scores of the experimental class and the control class clearly show the difference in the average post-test scores of the two classes in the graph below:

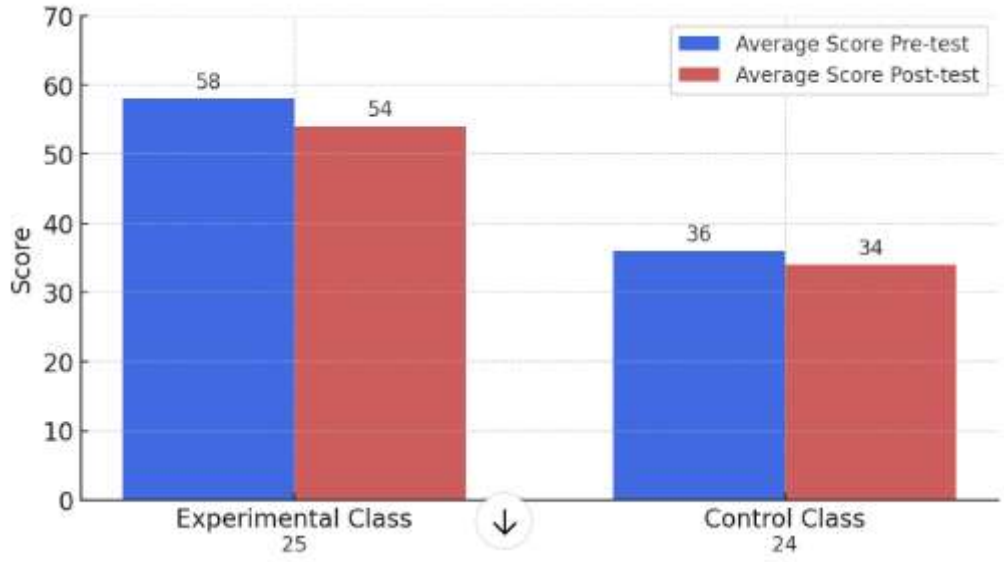

Chart 4.1 Sample Group Mean Graph

In the experimental class, taught using the Team Games Tournament model with the aid of chained question cards, the average pre-test score was 64.04 and increased to 79.81 in the post-test. Meanwhile, in the control class, taught using conventional methods, the average pre-test score was 63.33 and increased to 72.29 in the post-test.

The completion rate also increased significantly in the experimental class, from 42% in the pre-test to 88% in the post-test. Meanwhile, in the control class, the score only increased

from 46% to 67%. These data indicate that learning using the TGT model with the aid of chained question cards is more effective in improving student learning outcomes.

Data verification was conducted to ensure that the data obtained was suitable for analysis and supported statistical decision-making. The verification process included:

1. Normality Test

   The results of the Kolmogorov-Smirnov normality test indicated that the post-test data for both groups were not normally distributed (p-value <0.05). Therefore, the analysis continued using non-parametric techniques.

2. Homogeneity Test

   The Levene's test indicated that the variances of the two groups were not homogeneous, further strengthening the decision to use a non-parametric test.

3. Hypothesis Test (Mann-Whitney U Test)

The Mann-Whitney test was conducted to compare the post-test results between the experimental and control classes. The test results showed a significance value (p-value) of 0.023 <0.05, indicating a significant difference between the learning outcomes of the two groups. Therefore, H_o was rejected and H_a was accepted.

CONCLUSION

This study concludes that the use of chained question cards in the Team Games Tournament (TGT) cooperative learning model significantly impacted the mathematics learning outcomes of fifth-grade students at SD Negeri 102/II Sungai Kerjan. Students taught using this model showed greater improvement in learning outcomes compared to students taught using conventional methods.

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