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The Effectiveness of the Team Games Tournament (TGT) Learning Model Assisted by Fun Throw Ball on Numeracy Skills and Learning Motivation of Elementary School Students

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A B S T R A C T

This study aims to determine the use of the TGT learning model assisted by fun throw ball media is effective on students' numeracy skills and learning motivation. The research used is a quantitative quasi-experimental type with a nonequivalent control group design. Sampling using purposive sampling, namely class VB as the experimental group that uses the TGT learning model assisted by fun throw ball media and VA as the control group without fun throw ball media. Data analysis used normality test, homogeneity test, descriptive statistical test, independent sample t-test, and paired sample t-test. The research results show : (1) The numeracy skills of the experimental class students were better than the numeracy skills of the control class who did not receive treatment with the fun throw ball learning media (2) There was an increase in students' numeracy skills after receiving TGT learning model treatment assisted by fun throw ball media (3) Students' learning motivation increased after being given TGT learning assisted by fun throw ball media and the implementation of learning went well. Based on the results above, the use of the TGT learning model assisted by fun throw ball media is effective for students' numeracy skills and learning motivation.

1. Introduction

Education has a very large role in developing quality human resources. Because education contains all the knowledge that can be obtained by each individual during his life in all places and situations that have a positive impact on him (Pristiwanti et al., 2022). Education is defined as a form of effort used to prepare students through various forms of guidance and teaching that are carried out consciously and in a planned manner. The form of guidance and teaching is a medium that has become an obligation of a teacher's duties, where the teacher provides knowledge so that students can master the lesson material being delivered. However, the guidance and teaching applied are still far from perfect,

this can be seen from students who still have difficulty in understanding and solving problems from various general subjects, especially Mathematics.

Mathematics itself is able to produce students who are capable of developing cognitive, affective and psychomotor aspects. As is known, mathematics is a compulsory subject that is obtained from various levels. Mathematics can be obtained from the students' own experiences in daily activities (Mytra et al., 2023). Various obstacles that have been found by teachers are still many that have not found a bright spot. So that it becomes an obstacle in carrying out the learning process in the classroom. One of these obstacles is the lack of student activity and motivation to learn during learning. In addition, many still think that math lessons are very boring. It is undeniable that negative attitudes towards subjects will potentially cause learning difficulties or result in less than optimal learning outcomes (Hasibuan et al., 2022). So low motivation have an impact on decreasing the abilities possessed by students, so that student learning outcomes also decrease.

An ability that cannot be separated from mathematics is numeracy ability. Numeracy includes skills in implementing mathematical rules and concepts in real situations when the problems faced usually have no structure, have various methods for solving them, or even no method for solving them until the end and are related to non-mathematical aspects (Ekowati et al., 2019). So it can be concluded that numeracy skills according to (Mariamah et al., 2021) are the ability to solve everyday life problems using various numbers and symbols related to basic mathematics, the ability to analyze information displayed in various forms such as graphs, tables, charts, and so on. However, the reality revealed from the results of research (Ambarwati & Kurniasih, 2021; Faridah et al., 2022; Maghfiroh et al., 2021; Mumpuni et al., 2022) is that students' numeracy skills are still low.

Based on the results of initial observations at SDN Kalongan 02, the researcher gave a test as a preliminary study to explore the problems in class V. The test given was based on indicators of students' numeracy abilities. The underlying problem was the results of students' formative test scores which were still not optimal. From these results, it was found that some students still had difficulty in understanding the context of mathematical problems, how to operate numbers, and solving problems correctly. So to strengthen the existence of the problem, preliminary study questions were given to grade V students consisting of classes VA and VB.

After obtaining the value data from class VA students with an average of 53.5% and the average class of class VB students was 55%. From these results, students find it difficult to solve contextual questions. This is also due to the lack of student learning motivation. Low student learning motivation was discovered when the researcher gave a questionnaire related to student motivation in learning mathematics. The questionnaire was given after students had finished working on the preliminary study questions. The score obtained from the results of the student learning motivation questionnaire was 39.2%, which is in the low category. So the

first effort that can be made to improve numeracy skills is the existence of strong learning motivation from students.

Student learning motivation grows when students feel happy with the learning implemented by the teacher. Learning motivation is a basic thing for students to be able to obtain maximum learning results, where learning results will then be used as a basis for determining the achievement of expected competencies (Rahman, 2022). So the relationship between numeracy skills and students' learning motivation needs to be improved through various methods including appropriate learning models and learning media. Apart from the importance of the learning model applied by teachers, learning media also has an important role to support the success of the learning process. The use of learning media at the teaching orientation stage is a tool that greatly assists the learning process and makes the delivery of messages and lesson content more effective (Junaidi, 2019).

Both learning models and media can be packaged into a unit as a step in the ongoing learning process. The application of various learning strategies carried out by teachers has not been the best solution that can be solved. So it takes a novelty that can raise students' enthusiasm to learn. For example, learning combined with activities such as games is not considered to make students feel pressured, but can make students feel happy. Games that educate students are used as entertainment, because they can refresh their minds (Purnomo, 2020). Therefore, a learning model is implemented that includes game activities, one of which is the team games tournament (TGT) model.

The TGT model is a model that combines religious, nationalistic, autonomous, cooperative and honest actions of all students without requiring them to have different social classes (Rahayuni, 2020). According to Sakundari & Rizqi (2024) in the learning model, students who are divided into groups are asked to play a game to get a score. The learning media that will be used and contain game elements are media that involve physical movement activities in students. So that in the learning process that students get is not only in terms of student cognitive but also affective and psychomotor students. Media that can be combined with the TGT model is the fun throw ball media.

Fun throw ball media is a non-ICT learning media that contains a combination of sports activities with academic activities in the student learning process. The media is used outside of school, so that students will be more free to learn and think that learning can be done anywhere. The problem in this study is how much the numeracy skills and learning motivation of class V students of SDN Kalongan 02 have increased.The TGT model combined with fun throw ball media is considered to be able to improve students' numeracy skills and learning motivation. Therefore, the purpose of this study is to determine whether the use of the TGT learning model assisted by fun throw ball media is effective in numeracy skills and students' learning motivation, which includes: 1) differences in the average number of students' numeracy skills 2) increases in numeracy skills after being given the TGT model assisted by fun throw ball media 3) changes in student motivation after being given the TGT model assisted by fun throw ball media.

2. Methodology

This type of research is conducted using a quasi-experimental method with a nonequivalent control group design. In this study there are two classes, namely the experimental class and the control class. In this study there are two classes, namely the experimental class and the control class. Previously, the pretest will be given first to the two classes before the posttest is given, after the pretest data is obtained, the experimental class is given a treatment with the learning process using the TGT learning model with fun throw ball media. Meanwhile, the control class was given treatment with the same learning model but without using the fun throw ball media. Furthermore, both classes were given a posttest to see the differences in numeracy skills and student learning motivation. The one used as a reference to see the differences in treatment between the experimental class and the control class is based on Sugiyono (2018) which is presented in Table 1.

Table 1. Pretest and Posttest Nonequivalent Control Group Design

Group	Pretest	Treatment	Posttest
Experiment	O_1	X	O_2
Control	O_3	-	O_4

From Table 1, O_1 is the pretest of the experimental class, O_2 is the posttest of the experimental class, O_3 is the pretest of the control class, and O_4 is the posttest of the control class. And X is the treatment given to the experimental class using the TGT model with fun throw ball media, and while the treatment of the control class with the TGT model without using fun throw ball media. The sample in this study were students of class VA and class VB with the sampling technique used was purposive sampling. In this technique, researchers set certain criteria to obtain relevant and in-depth data. In this case, class VA was used as the control class and class VB as the experimental class.

Data collection in this study used test, observation, and questionnaire methods. Some of these research instruments include pretest and posttest numeracy skills, learning motivation questionnaires, and learning implementation observation sheets. These data will be collected which will then be used as answers to answer the problems of this study. After the data is collected, data analysis is continued consisting of normality tests, homogeneity tests and hypothesis tests.

3. Result and Discussion

In the first meeting, the teacher opened the lesson. After that, the teacher gave instructions to students about the use of parts of the fun throw ball media. At the second meeting, students have started to be able to use the fun throw ball media themselves. In each group that has been made based on the TGT model, each representative group goes forward to answer questions that have been prepared by the teacher. The documentation of the parts can be seen in Figure 1.

Figure 1. Explanation of Material and Stages During Learning

At this moment, students begin to understand what the teacher is asking for during the learning process ahead. To practice directly on students is carried out at the second meeting. At the second meeting can be seen in Figure 2.

Figure 2. Implementation of the TGT Model with Fun Throw Ball Media

Each group is very enthusiastic about completing the questions to compete as the champion based on good performance results. After going through several stages, students were then given a posttest question to see whether there were any changes related to numeracy skills in experimental class students and control class students. The next activity is to analyze the results of the collected data. Based on the results of the analysis of initial data and final data with the number of students in the experimental class and control class each being 28 students, the average value of the two classes was obtained. The output results above using descriptive statistics test from giving students pretest obtained with an average of 56.85 for the experimental class and 59.89 in the control class. Then the posttest results after being given treatment increased where the average posttest of the experimental class was 75.25 and 70.86 for the average posttest of the control

class. The average results of the pretest and posttest of the control class are presented in table 2 as follows :

Table 2. Average Results of Pretest and Posttest

	Descriptive Statistics				
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Experimental Pretest	28	42	72	56.86	8.100
Control Pretest	28	50	78	59.89	7.166
Experimental Posttest	28	65	95	75.25	6.889
Control Posttest	28	60	85	70.86	7.367

It can be seen that previously in the experimental class showed the lowest pretest value of 42, but after being given treatment, the posttest results experienced the highest value of 95. From the results of the four values, the data from the pretest and posttest results were analyzed using normality and homogeneity tests. To see the data in a normally distributed condition, it can be presented in Table 3.

Table 3. Normality Test Results

Group	**Shapiro Wilk**		
	Statistic	**df**	**Sig**
Experimental Pretest	.948	28	.182
Control Pretest	.932	28	.068
Experimental Posttest	.951	28	.206
Control Posttest	.939	28	.105

The results of the data obtained normality results in the pretest of the experimental class, namely 0.182> 0.05 and the pretest of the control class, namely 0.068> 0.05, meaning that both data are normally distributed. While for the posttest results, both are normally distributed, for the posttest of the experimental class, namely 0.206> 0.05 and the posttest of the control class, namely 0.105> 0.05. Furthermore, to find out that the two classes have homogeneous variations, it can be seen in Table 4.

Table 4. Homogeneity Test Results

	Levene Statistic	**df1**	**df2**	**Sig.**
Based on Mean	.525	3	108	.666
Based on Median	.343	3	108	.794
Based on Median and adjusted df	.343	3	104.862	.794
Based on trimmed mean	.538	3	108	.657

The results of the homogeneity test based on the mean obtained a value of 0.572> 0.05, which means that both classes have the same or homogeneous variance. It can be analyzed that both have low numeracy skills. After the normality test and homogeneity test were carried out, the next step was to test to answer the above

problems related to the effectiveness of the TGT model assisted by fun throw ball media on students' numeracy skills and learning motivation.

The first is, whether the use of the TGT model assisted by fun throw ball media is able to make the average results of students' numeracy ability tests better than the average results of students' numeracy ability tests that apply the TGT model without using fun throw ball media. In this case, it is done with an independent sample t-test. The following are the results of the processed data analysis presented in Table 5.

Table 5. Independent Samples T-Test Results

Student Posttest Result	t-test for Equality of Means						
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	2.305	54	.025	4.39286	1.90609	.57138	8.21433
Equal variances not assumed	2.305	53.758	.025	4.39286	1.90609	.57099	8.21473

From the results of the independent sample t-test, a 2-tailed sig value of 0.025 <0.05 was obtained, so there was a difference in the average of the experimental class and the control class. This means that the class that was applied with the TGT model assisted by fun throw ball media got a higher score than the class that did not receive the TGT model treatment assisted by fun throw ball.

Then the second is to find out whether there is a significant increase before and after the use of the TGT model assisted by fun throw ball on numeracy skills. To answer the second problem, a paired sample t-test was carried out. The results of the analysis of the test can be seen in Table 6.

Table 6. Paired Samples T-Test Results

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pretest-Posttest	-18.39286	3.44630	.65129	-19.72919	-17.05652	-28.241	27	.000

Based on Table 6 above, it is found that from the mean pretest-posttest of the experimental class, a value of -18.39286 is obtained. The value shows the difference between the average pretest and posttest of students' numeracy abilities and the difference is between -19.72919 to 17.05652 (95% Confidence Interval of the Difference Lower and Upper). The standard deviation is 3.44630 and the

standard error mean is 0.65129. Then for t count, the value is negative, which is -28.341, this is because the average pretest value is lower than the average posttest. The df (degree of freedom) value is also obtained at 27. In the sig. 2-tailed value, a value of 0.000 <0.05 is obtained, which means that there is an increase in the pretest results with the students' posttest results. Then it can also be seen that the increase in the average value in the experimental class was 32.34% while the control class only experienced an increase of 18.31%.

The TGT type of cooperative learning model can improve mathematical knowledge competency, so it is very suitable to be applied in elementary school students' learning (Hermawan & Rahayu, 2020; Rahayuni, 2020). In addition to the selection of learning models, the use of learning media also has an influence on learning. Learning media that combines technology in learning can make it easier for students to acquire knowledge, skills, and attitudes (Jauhar et al., 2022). Because teachers who rarely use concrete and other learning media can cause students to become bored when faced with the material that has been taught (Setyaningrum et al., 2023). One of the learning media that can make students actively participate in the implementation of learning is game media (Wijayanti, 2021).

The researcher then gave a questionnaire on students' learning motivation to find out whether there was a change in students' learning motivation after being given treatment. The results of the student learning motivation questionnaire before and after can be seen in Table 7.

Table 7. Student Learning Motivation Questionnaire Results

Learning Motivation Questionnaire	Average Score (%)	Category
Before Treatment	39.2%	Low
After Treatment	84.5%	Very High

The results of the average score of student learning motivation increased to 84.5%. Where the statements given from student learning motivation were 20 items referring to six indicators of student learning motivation. Yuliawati (2021) stated that teachers can use the Teams Games Tournament (TGT) learning model if there are the same learning problems in the class related to weak student learning motivation. Then the use of appropriate media can help motivate learning, students who have learning difficulties and personality formation (Ramadani et al., 2023).

In addition, the average percentage of learning implementation in classes using the TGT learning model assisted by fun throw ball media was 86.55%. This shows that the implementation of the learning model in classes using the TGT learning model assisted by fun throw ball media was carried out well. The TGT learning model is a form of learning that uses academic tournaments and quizzes and uses a score assessment system for individual progress where students compete as representatives of their team with other team members who have equal academic performance (Sholichah & Munshif, 2023).

4. Conclusion

Based on the results of research on the TGT learning model assisted by fun throw ball media, it can be concluded that the use of this learning model can be the average results of the arithmetic ability of students in the experimental class were better than the arithmetic ability of students in the control class. Then, there was an increase in arithmetic ability before and after in students who received the TGT learning model treatment assisted by fun throw ball media. Besides that changes in students' learning motivation, namely an increase from being initially in the low category to high after being given the TGT learning model treatment assisted by fun throw ball media, and supported by the implementation of learning that was carried out well.

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