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THE INFLUENCE OF THE TAI TYPE COOPERATIVE LEARNING MODEL ON STUDENT LEARNING OUTCOMES IN SOCIAL ARITHMETICS

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ABSTRACT

This research aims to determine the effect of the TAI type cooperative learning model compared to the direct teaching model on learning outcomes in Social Arithmetic material in class VII MTs Negeri Tanjungpinang. The approach to this research is a quantitative approach and the type of research used is Quasi Experimental. The population in this study were all class VII students at MTsN Negeri Tanjungpinang consisting of 6 classes. The sample was determined by taking two classes. The sampling technique used was purposive sampling technique. The selected samples were class VII.2 as an experimental class using the TAI (Team Assisted Individualization) cooperative learning model and class VII.4 as a control class which did not use the TAI type cooperative learning method. Data was obtained using test instruments that have been tested for validity and reliability. The results of data analysis in this study show that there is an influence of using the TAI (Teams Assisted Individualization) type cooperative learning model on the social arithmetic learning outcomes of class VII MTs Negeri Tanjungpinang for the 2023/2024 academic year. From the results of the analysis it can be concluded that H_a is accepted and H_o is rejected, so there is a significant influence of using the TAI type cooperative learning model in the experimental class on student learning outcomes in social arithmetic material.

Keywords: TAI type cooperative learning model, learning outcomes, social arithmetic, MTsN Tanjungpinang students

INTRODUCTION

Education is very important for a nation. The quality of a nation's life is largely determined by educational factors. In the Republic of Indonesia law no. 20 of 2003 article 1 concerning the national education system, explains that what is meant by "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble morals, as well as skills needed by himself, society, nation and state". Education is a measure of a country's progress. Developed countries have set higher education standards to deal with one of the education problems in Indonesia, namely the low quality of education(Hasibuan, 2019).

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According to Febrianti, et al(2022) Learning is a system that facilitates individual learning interactions with educational resources. Learning is a two-way communication process that includes learning and teaching activities. Through interaction between humans and their environmentLearning is the process by which humans change the way they behave. Learning as a process, which is marked by personal transformation. Nuraeni (2020) states that learning is a complex action and behavior of students. Learning outcomes can create specific abilities for the learner. After carrying out the learning process, you have skills, knowledge, attitudes and values. Where in knowledge activities that can be carried out are to improve knowledge skills by learning mathematics.

According to Latif & Maros (2020), mathematics is the queen of science, all branches of science require calculations. Mathematics education can be said to be a science that has a very important role in the field of science and technology Nyoman, (2022). Mathematics is a science that continues to develop to meet the technological needs required by every individual. Because mathematics is a study that is taught at every level and in all forms of education, which suits the needs of each type of education.

As an educator, it is important to be able to create a learning atmosphere that involves active participation and pay special attention to students who are less active in the learning process, as well as identifying problems faced when students get low grades and looking for solutions to solve the problem. So with this, a learning model is needed that can activate students during the learning process. If the learning process takes place effectively then learning can be said to be good. Moreover, using methods that are appropriate to the material being taught, which ultimately produces results as expected. In line with what Rahim & Rahman (2022) said, in this case a learning model and technique is needed in order to improve students' problem solving abilities during mathematics learning, encourage greater student participation and achieve the expected learning outcomes.

Based onInitial observations using interviews on May 5 2023 were conducted at MTs Negeri Tanjungpinang, researchers obtained data that the mathematics learning that took place at MTs Negeri was learning that was still teacher-centered. During the learning process students still pay less attention to the teacher's explanations, there were only a few students who responded, then students did not participate actively, and there was a lack of interaction with other students. There are some other students who may not be interested in learning mathematics, so in this case they say that just looking at a mathematics question is difficult, let alone wanting to do it. Well, here you need an active teacher, because if you don't direct it it won't work. But the teacher will still provide motivation from the start that mathematics is what makes them not a hobby, not because the teacher is angry but because they don't understand and are interested. In short, if you want to master mathematics, you have to remember the 3x4 formula. This means that there are 3 numbers, namely whole decimal fractions and the 4 operations are addition, subtraction, multiplication and division. If they remember this formula and apply it, it will be easy to understand and master mathematics.

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According to Arends, the term learning model is related to the methodology that will be used, which includes learning objectives, stages in learning activities, learning environment, and classroom management (Nurhaliza et al, 2024). A learning model is a form or system that is used as a guide to help plan learning for tutorials and classroom teaching.

According to Wulandari & Kunci, (2022) cooperative learning is a teaching method where a number of students each have different skill levels to form members of a small group. With cooperative learning, students collaborate in small groups to support each other consisting of 4 students with different skill levels (Divya, 2024). The TAI (Team Assisted Individualization) model is an interesting form of work. In this case it is said to be interesting because it combines individual learning and group learning. According to Nasution, et al(2022)The cooperative learning method known as Teams Assisted Individualization (TAI) is a group-based learning approach that uses individual assessment with group collaboration. The aim of this approach is to increase students' knowledge, skills and motivation (Sari et al, 2023). The essence of this TAI type cooperative learning method is organizing students into small, diverse learning groups, consisting of 4-5 students in each group, and providing individual assistance to students who need it.

Widyanto & Istiqomah (2020) revealed that the aim of assessing learning outcomes is to determine whether students have understood the material being taught and whether they are using the right strategies.

Meanwhile, learning mathematics functions to develop logical, analytical and critical thinking skills, which are core skills needed in various areas of life. However, the results of interviews at MTs Negeri Tanjungpinang revealed that mathematics learning still tends to be teacher-centered, with a lack of student participation and low interest in the subject. From these findings, a clear research gap is the lack of use of learning models that can facilitate more active interaction between teachers and students, as well as between students and each other, in the context of mathematics learning at MTs Negeri Tanjungpinang. Therefore, this research aims to fill this gap by exploring the influence of the TAI (Team Assisted Individualization) type cooperative learning model on student learning outcomes in social arithmetic material. The aim of this research is to understand how the application of the TAI type cooperative learning model can influence student learning outcomes in mathematics learning, especially in social arithmetic material.

RESEARCH METHODS

The procedures and analytical methods used in this research follow a quantitative approach with a Quasi Experimental research type. According to Zega et al (2022), the type of Quasi Experimental research is a type of research that assigns two classes, one from the population and used as an experimental class, and the other as a control class directly with each other. This research was conducted

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at the Tanjungpinang State MTsN with an address on Jalan Raja Ali Haji Tanjung Ayun Sakti, Bukit Bestari District, Tanjungpinang City, Riau Islands Province. The research was conducted in the odd semester of 2023/2024.

The data collection technique used is a test. The test is used to measure the presence or absence of the ability of the object under study (Nasution, 2022). The test consists of 5 initial ability test questions and 5 posttest questions in the form of essay/description questions. If all answers are correct, then the total score is 100. The use of essay tests was chosen because it can provide a more comprehensive picture of students' understanding of the material. After the data is collected, the next step is to carry out data analysis.

The analytical method used consists of several steps. First, statistical assumption tests were carried out which included normality tests and homogeneity tests. The normality test aims to find out whether the data is normally distributed or not. Meanwhile, the homogeneity test aims to find out whether the variance between the experimental group and the control group is homogeneous or not. After ensuring that the statistical assumptions are met, the next step is to test the hypothesis using the independent sample t-test. This test was chosen because this research uses a Quasi Experimental design with two groups, namely an experimental group and a control group. Independent sample t-test was used to compare the average test results between the two groups.

The results of this test will provide information on whether there are significant differences between student learning outcomes in the two groups. The selection of this analytical method is based on the characteristics of research that uses a quantitative approach and the type of Quasi Experimental research. Through this method, research can provide a deeper understanding of the effectiveness of an intervention or treatment on student learning outcomes. Thus, it is hoped that the results of this data analysis can make a significant contribution to the development of education at the Tanjungpinang State MTsN and the broader educational context.

RESULTS AND DISCUSSION

Table 1 Qualification of Initial Ability Test Scores for Control Class Students

No	Category	Qualification	Value Range	Frequency	Percentage (%)
1.	A	Very high	90-100	2	6%
2.	B	Tall	80-89	3	9%
3.	C	Currently	65-79	4	12%
4.	D	Low	55-64	4	12%
5.	E	Very low	0-54	20	60%

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The number of students	33	100%

Based on the results of research carried out by researchers at MTs Negeri Tanjungpinang on the initial ability test scores in the control class as explained in Table 1, that 2 students (6%) obtained category A very high qualifications, 3 students (9%) in category B high qualifications. category C medium qualifications 4 students (12%), category D low qualifications 4 students (12%), and category E very low qualifications 20 students (60%).

Table1**Qualification of Initial Ability Test Scores for Experimental Class Students**

No	Category	Qualification	Value Range	Frequency	Percentage (%)
1.	A	Very high	90-100	2	6%
2.	B	Tall	80-89	2	6%
3.	C	Currently	65-79	11	33%
4.	D	Low	55-64	5	15%
5.	E	Very low	0-54	13	39%
The number of students				33	100%

From the data presented in Table 2, the majority of students (39%) have ability qualifications at the "Very Low" level with a score range between 0-54. Meanwhile, only a small proportion of students (6%) achieved the "Very High" qualification with a score range of 90-100. Most of the students (72%) were in the score range between 0-79, indicating variations in ability among students.

Posttest Results

*Posttest*is the final assessment or assignment after the presentation of the material. The purpose of the posttest given by researchers was to assess student progress after being given treatment with the TAI (Teams Assisted Individualization) type cooperative learning model applied to social arithmetic material. The following are the results of the social arithmetic posttest in the table below.

Table 3 Posttest Score Qualifications for Control Class Students

No	Category	Qualification	Value Range	Frequency	Percentage (%)
1.	A	Very high	90-100	4	12%

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2.	B	Tall	80-89	9	27%
3.	C	Currently	65-79	10	30%
4.	D	Low	55-64	5	15%
5.	E	Very low	0-54	5	15%
The number of students				33	100%

Based on Table 3 above, it can be seen that 4 students (12%) got category A with very high qualifications, 9 students (27%) got category B with high qualifications, 10 students (30%) got category C with moderate qualifications. %), students who received category D low qualifications were 5 students (15%), and students who received category E very low qualifications were 5 students (15%).

Table 4**Qualification of Posttest Scores for Experiment Class Students**

No	Category	Qualification	Value Range	Frequency	Percentage (%)
1.	A	Very high	90-100	12	36%
2.	B	Tall	80-89	10	30%
3.	C	Currently	65-79	9	27%
4.	D	Low	55-64	2	6%
5.	E	Very low	0-54	0	0%
The number of students				33	100%

Based on the data in Table 4 above, it can be seen that 12 students (36%) got category A with very high qualifications, 10 students (30%) got category B with high qualifications, 9 students (27%) got category C with medium qualifications. %), students get category D with low qualifications 2 students (6%).

Normality Test Analysis Results

Table 5 Table of Posttest Normality Test Results

Normality test					
Learning outcomes Social Arithmetic		*Shapiro Wilk*			
		Statistics	Amount of data	Significance	Information
Control Posttest	Class	0.948	33	0.117*	Normal

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Experimental Posttest	Class	0.949	33	0.125*	Normal

(Source: SPSS Application Version 23)

Based on Table 5 above, it shows that the results of the normality test using Shapiro Wilk show that each test has a different statistical value. The normality test on the control class posttest value was > 0.05 because the value was 0.117>0.05. This shows that the control class data is normally distributed. Meanwhile, the normality test on the experimental class posttest score was 0.125>0.05. So the experimental class data shows that the values are normally distributed.

Homogeneity Test Analysis Results

Table 6 Table of Posttest Normality Test Results

Normality test					
Learning outcomes Social Arithmetic		*Shapiro Wilk*			
		Statistics	Amount of data	Significance	Information
Control Posttest	Class	0.948	33	0.117*	Normal
Experimental Posttest	Class	0.949	33	0.125*	Normal

(Source: SPSS Application Version 23)

Based on Table 6 above, it shows that the results of the normality test using Shapiro Wilk show that each test has a different statistical value. The normality test on the control class posttest value was > 0.05 because the value was 0.117>0.05. This shows that the control class data is normally distributed. Meanwhile, the normality test on the experimental class posttest score was 0.125>0.05. So the experimental class data shows that the values are normally distributed.

Homogeneity Test Analysis Results

Table 7 Posttest Homogeneity Test Results

Test of Homogeneity of Variance

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		Levene Statistic	Df1	Std. Deviation	Sig.
Hasil Belajar Aritmatika	Based on Mean	3.532	1	64	.065
Sosial	Based on Median	2.930	1	64	.092
	Based on Median and with adjusted df		1	55.108	.093
		2.930		64	.063
	Based on trimmed mean	3.568	1		

Table 7 displays the results of the posttest homogeneity test using Levene's Test for the variable "Social Arithmetic Learning Outcomes." The significant values (Sig.) are all greater than 0.05, indicating that the variance between groups is homogeneous.

Hypothesis Test Results

Table 8 Independent Samples t-test results

T-Test

Group Statistics

Kelas		N	Mean	Std. Deviation	Std. Error Mean
Hasil Belajar Aritmatika	Posttest Eksperimen	33	82.1212	11.86054	2.06465
Sosial	Posttest Kontrol	33	68.7879	16.91109	2.94384

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Mean						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Sid. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Hasil Belajar Aritmatika Sosial	Equal variances assumed	3.532	.065	3.708	64	.000	13.33333	4.63857	-47872	18.05448
	Equal variances not assumed			3.708	57.5348	.000	13.33333	4.63857	-47988	18.05564

(Source: SPSS Application Version 23)

Based on the results of the independent samples t-test in Table 8, the sample above has a significance level of 5%. This shows a significance result (2-tailed) which is 0.000. The p-value is 0.000 < 0.05 ($p<0.05$). So it can be said that $H_a$accepted as well as $H_o$rejected. So, it can be said that there is an influence of using the TAI type cooperative learning model on the social arithmetic learning outcomes of class VII students at MTs Negeri Tanjungpinang for the 2023/2024 academic year.

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Discussion

The results of the influence of the TAI (Teams Assisted Individualization) type cooperative learning model on student learning outcomes in social arithmetic material at MTs Negeri Tanjungpinang show that in the control class, the majority of students (60%) were in the very low category, while in the experimental class, only 39 % of students who are in this category. After implementing the TAI model, there was a significant increase in student learning outcomes in the experimental class. Posttest data shows that 36% of students in the experimental class achieved the very high category, compared to only 12% in the control class. There were no students in the experimental class who were in the very low category after implementing the TAI model, indicating the effectiveness of this model in improving students' understanding. The results of the normality test using Shapiro-Wilk show that the data is normally distributed with a significance value greater than 0.05 for both classes.

The homogeneity test using Levene's Test also shows that the variance between groups is homogeneous. The independent samples t-test shows that there is a significant difference between the control and experimental classes with a p-value of 0.000, which means $H_a$accepted and $H_o$rejected. From these results, it can be concluded that the TAI type cooperative learning model is effective in improving student learning outcomes in social arithmetic material. This model not only helps students understand the material better but also increases their motivation to achieve higher learning outcomes. Therefore, the application of the TAI model is recommended in mathematics learning to improve student learning outcomes at school.

Cooperative learning is used to provide students with the knowledge, concepts, abilities and understanding needed to make good contributions (Harefa et al, 2022). In line with the opinion of Rosmala (2021) that a learning model can also mean a teaching plan or a learning pattern which has quite important meaning because the learning model is one of the learning components that serves as a guide in carrying out activity steps. The difference between this research and the research carried out is that the results provide a general understanding of the mathematics learning model and are specific about the TAI model, which underlines the importance of cooperative learning in improving learning outcomes by utilizing small, heterogeneous groups.

In line with the opinion of Ahmad et al (2021), the TAI (Team Assisted Individualization) learning model is a form of cooperative learning, which means that students are placed in small groups that are heterogeneous, for example in terms of academic grades and gender. Ahmad et al.'s (2021) research focuses on the influence of the TAI learning model on science learning outcomes in elementary schools where students are grouped into small, heterogeneous categories, for example in terms of academic grades and gender.

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After being given the TAI type cooperative learning model, the researcher gives a final test, at this stage students will be given a posttest to determine the students' understanding achieved in social arithmetic material after carrying out the learning process using the TAI type cooperative learning model. Students are prohibited from working together during the test. To see whether or not there is an influence of the TAI (Teams Assisted Individualization) type cooperative learning model on social arithmetic learning outcomes, it can be observed from the results of data processing.

The results of this research have significant practical and theoretical implications. Practically, the application of the TAI type cooperative learning model has proven to be effective in improving student learning outcomes, so it is recommended to be applied in mathematics learning in schools. Theoretically, these findings support the theory that cooperative learning can increase student motivation and understanding, enriching the literature on effective teaching methods. This research makes an important contribution in understanding how structured and collaborative learning strategies can improve learning outcomes, especially in complex material such as social arithmetic. It also encourages further research on the adaptation of TAI in various educational contexts.

CONCLUSION

Conclusion Based on the results and discussion in this research, it can be said that the use of the TAI (Teams Assisted Individualization) type cooperative learning model has an influence on student learning outcomes in social arithmetic material. The results of this research also show that mathematics learning outcomes using the Teams Assisted Individualization (TAI) model in social arithmetic material are higher than using conventional learning models.

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