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The Effectiveness of Mathematics Learning Through the Implementation of the Team Assisted Individualization (TAI) Cooperative Model for Class VIII B Students of MTS Al-Bashirah Makassar

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ABSTRACT

This research aimed to determine the effectiveness of Team Assisted Individualization (TAI) type of Cooperative Model in learning Mathematics for students of Grade VIII B MTs. Al-Bashirah Makassar. The type of this research was a pre-experimental research with one group pretest and posttest design. This research referred to the effectiveness criteria of learning. The research was conducted on students of Grade VIII B MTs. Al-Bashirah Makassar totaling 20 students. The results of this research showed that: (1) the students' mean score after applying Team Assisted Individualization type of cooperative model was 70.25 and it was in the fair category. From the results it was obtained that 18 or 90% students achieved individual completeness, 2 or 10% students did not achieve individual completeness was classically achieved with a normalized gain value of 0.47 in the medium category. (2) the mean percentage of students' activity was 84.17% active in learning mathematics. (3) the mean percentage of students giving a positive response was 95%. Therefore, learning mathematics was effective by using Team Assisted Individualization type of cooperative model of students grade VIII B MTs Al-Bashirah Makassar.

Keywords: The Effectiveness, Learning Mathematics, Team Assisted Individualization Model

INTRODUCTION

Law of the Republic of Indonesia Number 20 of 2003 states that education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual religious strength, self-control, personality, intelligence, noble morals, and the skills needed by themselves, society, the nation and the state.

One way that the government needs to overcome this problem is byincreasing development in the field of education both in terms of quantity and quality, namely by improving facilities and infrastructure as well as the quality of educators and students.

In an effort to improve the quality of education, mathematics, which is one of the basic sciences taught at every level of education, plays an important role and has a very large influence on the development of other educational sciences.Mathematics is also a universal science that underpins the development of modern technology, plays a vital role in various disciplines, and advances human thought. The rapid development of information and communication technology today is based on mathematical developments in number theory, algebra, analysis, probability theory, and discrete mathematics. Mastering and creating future technology requires a strong mastery of mathematics from an early age. According to the Ministry of National Education, mastery of mathematics through junior high school mathematics learning aims to understand mathematical concepts, develop mathematical

reasoning, develop problem-solving skills, develop mathematical communication skills, and develop an appreciation for mathematics.

In line with the purpose of mathematics in schools, we can see that school mathematics plays a crucial role. Students need mathematics to meet practical needs and solve problems in everyday life. For example, they can count, calculate volume and weight, collect, process, present, and interpret data, and use calculators and computers. The benefit of early mathematics learning is that students can think systematically, through orderly and specific sequences. By learning mathematics, our brains become accustomed to solving problems systematically. Therefore, when applied in real life, we can solve every problem more easily. Learning mathematics trains us to be more careful, meticulous, and proactive in our actions.

One of the main problems facing the Indonesian nation is the low quality of education. Various efforts have been made to improve the quality of national education, including through various teacher training and competency development programs, the provision of learning tools, improvements to educational facilities and infrastructure, and enhancements to school management. However, various indicators of education quality have not shown significant improvement. Specifically in the field of mathematics, most students dislike mathematics, leading to a decline in motivation to learn it, which in turn leads to a decline in student achievement. One example of this low mathematics achievement is the results of the National Examination (UN) in recent years. In 2017, the average grade for junior high school students in South Sulawesi decreased, particularly in mathematics, from 54.06 to 51.65. This is a persistent problem at every level of education. To this day, mathematics is still considered a daunting, difficult, and boring subject. Most students assume that mathematics is only understood by special individuals who are naturally gifted in mathematics. Consequently, it's not uncommon for the majority of students to dislike mathematics and lack motivation to learn it. This results in ineffective classroom learning and low mathematics learning outcomes. To make students' mathematics learning more effective, a learning model is needed that is appropriate to the mathematics learning material, namely the Team Assisted Individualization (TAI) type cooperative learning model.

The TAI learning model is a type of cooperative learning that aims to improve situations where individual success is influenced by the success of the group. By implementing TAI, students will be motivated to learn mathematics, help each other solve problems, express ideas, and assist group members who do not yet understand the material, thereby increasing tolerance and cohesiveness among group members.

The objective to be achieved in this research is to determine the effectiveness of the Team Assisted Individualization (TAI) cooperative model in mathematics learning for class VIII B students of MTs. Al-Bashirah Makassar in terms of the completeness of students' mathematics learning outcomes, students' activities in the mathematics learning process and students' responses to mathematics learning.

This type combines the advantages of cooperative learning and individual learning. Each group member is given a series of problems to work on individually. They then check their own work, and then check their work with the other members. If the problem is solved correctly, students can proceed to the next stage. However, if a student makes an error, they must complete the next problem. The problems are arranged according to difficulty level. Therefore, the

learning activity is primarily focused on problem-solving. A characteristic of this type of TAI is that each student is brought into groups individually for discussion and feedback by group members, and all group members are held accountable for the overall solution as a shared responsibility.

The stages of designing the implementation of the TAI type cooperative model on a topic use the following learning steps:

Table 1. Elements of TAI Type Cooperative Learning Model

Phase	Teacher Behavior
Phase-1 Conveying goals and motivating students	The teacher conveys all the learning objectives to be achieved in the lesson and motivates students to learn.
Phase 2 Presenting information	*Teaching Group* • Distribution of handouts and worksheets for each student. • A brief explanation of the main material that will be discussed at the meeting by the teacher.
Phase 3 Organizing students into study groups	❖ *Teams* • Group formation where students are divided into small groups of 4-5 people. ❖ *Placement test* • The procedure for forming groups is based on pre-test sets and ranked based on the scores obtained.
Phase 4 Guiding groups to work and study	❖ *Student Creative* • Students study individually the material contained in the handout and work on the questions contained in the LKS. ❖ *Team Study* • Students discuss the material and correct the LKS answers with their group mates.

Phase-5 Evaluation	❖ *Whole-Class Units* • Group representatives come forward to present the results of their group work. • Other groups provide responses to questions. • Evaluation of discussion results and improvement of students' answers by the teacher. ❖ *Facts Test* • Implementation of the final test and students work on it individually.
Phase-6 Giving awards	❖ *Team Scores and Team Recognition* • Announcement of scores for each group during one cycle as well as determination and awarding of awards for super groups, great groups and good groups.

RESEARCH METHODS

This type of research is a pre-experimental study involving only one experimental class with the aim of determining the effectiveness of mathematics learning through the TAI type cooperative model for class VIII B students at MTs. Al-Bashirah Makassar. The design in this study is the One Group Pretest-Posttest Design.This is an experiment conducted on a single group without a comparison group. This model uses a pretest before administering the treatment. This allows for more accurate results because it can be compared with the pre-treatment situation.The sample in this study was one class taken from all classes of MTs. Al-Bashirah Makassar with Random Sampling, namely the students of class VIII B MTs. Al-Bashirah Makassar. Data from the research results were analyzed using descriptive and inferential statistics. Student learning outcome data were analyzed using t-test and Normality.

RESEARCH RESULT

Descriptive analysis of the pretest scores given to the students taught can be seen in the following table.

Table 2. Statistics of Students' Mathematics Learning Outcomes Scores Before the TAI Type Cooperative Model Was Implemented (Pretest) and After the TAI Type Cooperative Model Was Implemented (Posttest)

Statistics	Pretest	Posttest
Ideal score	100	100
Highest score	57	85
Lowest score	18	43
Score range	39	42
Average score	45.55	70.25
Standard Deviation	8,798	9,818

Based on table 2 above, it was obtained that from 20 samples, the average pretest score before treatment was 45.55 with a standard deviation of8,798. The average posttest score of students was 70.25 with a standard deviation of9,818The highest pretest score obtained by students was 57 and the lowest score was 18, while the highest score for the posttest was 85 and the lowest score was 43.

Table 3. Frequency Distribution and Percentage of Students' Mathematics Learning Outcomes Scores Before (Pretest) and After (Posttest) the Team Assisted Individualization (TAI) Cooperative Model was Implemented

No.	Score	Category	Pretest		Posttest	
			Frequency	Percentage (%)	Frequency	Percentage (%)
1.	$0 \leq x \leq 65$	Not enough	20	100	6	30
2.	$65 < x \leq 76$	Enough	0	0	9	45
3.	$76 < x \leq 89$	Good	0	0	5	25
4.	$89 < x \leq 100$	Very good	0	0	0	0
Amount			20	100	20	100

Based on the table above, it can be concluded that the student learning outcomes before the implementation of the TAI type cooperative model were 20 students (100%) who obtained scores in the less category, and none obtained scores in the sufficient (0%), good (0%), and very good (0%) categories. While the posttest results showed that 6 students (30%) obtained scores in the less category, 9 students (45%) obtained scores in the sufficient category, 5 students (25%) obtained scores in the good category, and no students obtained scores in the very good category (0%).

Table 4. Description of Students' Mathematics Learning Outcomes Before (Pretest) and After (Posttest) the Team Assisted Individualization (TAI) Cooperative Model was Implemented

Score Interval	Category	Pretest		Posttest	
		Frequency	Percentage (%)	Frequency	Percentage (%)
$0 \leq x < 65$	Not Completed	20	100	2	10
$65 \leq x \leq 100$	Completed	0	0	18	90
Amount		**20**	**100**	**20**	**100**

The criteria for a student to be said to have completed learning if they have a score of at least 65. From table 4 above, the pretest results show that the number of students who did not meet the individual completion criteria was 20 people or 100% of the total number of students,

while students who met the individual completion criteria from the total number of students were 0 people or 0%. From the description above, it can be concluded that the learning outcomes of class VIII B MTs. Al-Bashirah Makassar students before the implementation of the Team Assisted Individualization (TAI) cooperative model had not met the classical student learning outcome completion indicators, namely ≥ 70% and were classified as very low.

Meanwhile, the posttest results showed that 2 students (10%) did not complete the course, while 18 students (90%) met the individual completion criteria. If linked to the student learning outcome completion indicators, it can be concluded that the learning outcomes of class VIII B MTs. Al-Bashirah Makassar students after implementing the Team Assisted Individualization (TAI) cooperative model have met the classical student learning outcome completion indicators, namely ≥ 70%.

Table 5. Description of Improvement in Students' Mathematics Learning Outcomes After Implementing the Team Assisted Individualization (TAI) Cooperative Model

Gain Value	Category	Frequency	Percentage (%)
$g < 0.3$	Low	2	10
$0.3 \leq g < 0.7$	Currently	15	75
$g \geq 0.7$	Tall	3	15
Amount		**20**	**100**

Based on table 5 above, it can be seen that there are 2 or 10% of students whose gain value is <0.3, which means that their learning outcomes are in the low category, and 15 or 75% of students whose gain value is in the interval $0.3 \leq g < 0.7$, which means that their learning outcomes are in the medium category. From table 5, it can also be seen that 3 or 15% whose gain value is ≥ 0.7 or their learning outcomes are in the high category. If the average normalized gain of students of 0.46 is converted into the 3 categories above, then the average normalized gain of students is in the interval $0.3 \leq g < 0.7$. This means that the increase in mathematics learning outcomes of class VIII B MTs. Al-Bashirah Makassar after implementing the Team Assisted Individualization (TAI) cooperative model is generally in the medium category.

Table 6. Percentage of Student Learning Activities Through the Implementation of the Team Assisted Individualization (TAI) Cooperative Model

No.	Student Activities	The th meeting					Average	Percentage (%)
		I	II	III	IV	V		
	Positive Activities							
1.	Students who attend lessons in class (students who are present)	***P R***	19	20	19	***P O***	19.33	96.65
2.	Students who pay attention to the material being taught	***E***	20	20	20	***S T***	20	100
3.	Students who take notes on what the teacher says	***T E***	20	20	20	***T***	20	100
4.	Students who ask questions about lesson material that they do not	***S T***	15	16	15	***E S***	15.33	76.65

	understand during the teaching and learning process			***T***		
5.	Students sit in groups according to the teacher's instructions	20	20	20	20	100
6.	Students who work on LKS individually	20	20	20	20	100
7.	Students who experience difficulties ask their group members for help.	16	16	16	16	80
8.	Students discussing the answers to the worksheets they have completed individually with their group members	17	18	17	17.33	86.65
9.	Students who receive awards based on scores obtained by students as a group or individually	5	5	5	5	25
	Amount					**505**
	Average Percentage					**84.17**
	Negative Activities					
10.	Students who carry out activities outside the learning process such as playing, disturbing friends and so on	2	2	1	1.67	8.35
	Amount					**8.35**
	Average Percentage					**8.35**

Based on table 6 above, it can be concluded that the percentage of positive student activity through the implementation of the Team Assisted Individualization (TAI) cooperative model is 84.17% and the percentage of passive student activity is 8.35%. So, student activity through the implementation of the Team Assisted Individualization (TAI) cooperative model is said to be effective because it has met the classical criteria for student activity, namely ≥ 75% of students are actively involved in the learning process.

Table 7. Percentage of Student Responses to Mathematics Learning

No.	Aspects in Question Category	Frequency Yes	 No	Percentage (%) Yes	 No
1.	I feel very happy to follow the mathematics learning through the model applied by the teacher.	20	0	100	0
2.	Do you enjoy discussing with your classmates during learning?	17	3	85	15

3.	Learning mathematics through the model applied by the teacher makes it easier for me to understand the material.	20	0	100	0
4.	I like giving worksheets to be done individually and then discussed with group members.	20	0	100	0
5.	Learning mathematics through the model applied by the teacher makes me more active in the learning process.	18	2	90	10
6.	I feel that there is progress after participating in learning through the model implemented by the teacher.	19	1	95	5
7.	I am interested in participating in further mathematics learning using the Team Assisted Individualization (TAI) model.	19	1	95	5
	Overall Average			**95**	**5**

Based on table 7, it can be seen that in general, the average class VIII B students of MTs. Al-Bashirah Makassar gave a positive response to the implementation of learning through the Team Assisted Individualization (TAI) cooperative model, where the average percentage of student responses was 95%. Thus, the response of students taught with this method can be said to be effective because it has met the student response criteria, namely ≥ 75% giving a positive response.

DISCUSSION

The effectiveness of students' mathematics learning after the implementation of the TAI type cooperative model shows that the average score of mathematics learning outcomes of class VIII B students of MTs. Al-Bashirah Makassar = 70.25 and has exceeded the minimum completeness score = 65. Meanwhile, classical completeness reached 90% or there were 18 students who completed it out of 20 students.The result of normalized gain or the average normalized gain of students after being taught using the Team Assisted Individualization (TAI) cooperative model is 0.46. This means that the increase in mathematics learning outcomes of class VIII B students of MTs. Al-Bashirah Makassar after the implementation of the Team Assisted Individualization (TAI) cooperative model is generally in the moderate category because the gain value is in the interval $0.3 \leq g < 0.7$.

The results of observations of student activities in mathematics learning through the application of the Team Assisted Individualization (TAI) cooperative model in class VIII B MTs. Al-Bashirah Makassar show that students are active in learning both before and after learning, students' social relationships are getting better, both students with students and students with teachers and have met the active criteria because according to the student activity indicators that student activities are said to be successful/effective if at least 75% of students are actively involved in the learning process. While the results of the analysis of student activity observation data show the average percentage of student activity frequency with the Team Assisted Individualization (TAI) cooperative model, namely 84.17% of student activities that

increase each meeting. This can be concluded that students have been actively participating in the mathematics learning process through the application of the Team Assisted Individualization (TAI) cooperative model.

The results of the analysis of student response data obtained after conducting this research showed a positive response. From a number of aspects asked, students were happy with the teaching method applied by the teacher using the Team Assisted Individualization (TAI) cooperative model. Students felt more confident in expressing their opinions and felt there was progress after the implementation of the Team Assisted Individualization (TAI) cooperative model in mathematics learning. In general, the average overall percentage of student responses was 95%. This is considered a positive response as the predetermined standard of $\geq 75\%$.

The results of the inferential analysis show that the pretest and posttest data have met the normality test which is a prerequisite test before conducting a hypothesis test. The pretest and posttest data have been normally distributed because the P value $> \alpha = 0.05$. Because the data is normally distributed, it meets the criteria for using the one sample t-test by previously performing a Normalized gain on the pretest and posttest data. The Normalized gain test aims to determine how much the students' learning outcomes have increased after being given treatment. The results of the hypothesis test using the one sample t-test by previously performing a normalized gain on the pretest and posttest data (Appendix D) have obtained a P value $= 0.000 < 0.05 = \alpha$, so that H0 is rejected and H1 is accepted, which means that "there is an increase in mathematics learning outcomes after the implementation of the Team Assisted Individualization (TAI) cooperative model where the gain value is more than 0.30".

CONCLUSION

Based on the results of the analysis of the discussion data that has been presented, it can be concluded that the implementation of the Team Assisted Individualization (TAI) cooperative model is effective in applying it to class VIII B students of MTs. Al-Bashirah Makassar with several indicators, namely the mathematics learning outcomes of class VIII B students of MTs. Al-Bashirah Makassar have increased with the normalized gain value being in the interval $0.3 \leq g < 0.7$ which indicates that the increase in learning outcomes that occurred is categorized as moderate. The results of descriptive and inferential statistical analysis, the learning outcomes of class VIII B students of MTs. Al-Bashirah Makassar after the implementation of the Team Assisted Individualization (TAI) cooperative model experienced individual and classical completion, student activities related to learning activities from the aspects observed as a whole are categorized as active. This is indicated by the average percentage of student activity, namely 84.17% active in mathematics learning, and the results of the analysis of student responses to mathematics learning through the implementation of the Team Assisted Individualization (TAI) cooperative model reached $\geq 75\%$, namely the average percentage of students' frequency of giving YES answers or positive responses is 95%. Thus, it can be concluded that class VIII B students of MTs. Al-Bashirah Makassar gave a positive response to mathematics learning through the implementation of the Team Assisted Individualization (TAI) cooperative model.From the results of descriptive and inferential analysis, all effectiveness indicators have been met. Thus, it can be concluded that the Team Assisted Individualization (TAI) cooperative model is effectively implemented in mathematics learning for class VIII B students of MTs. Al-Bashirah Makassar.

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