

The Effect of Team Assisted Individualization (TAI) Cooperative Learning on Mathematics Learning Outcomes

*Wahyuningsih Nurmala¹, Saharuddin², M. Arif Tiro³, Wahidah Sanusi⁴

¹ Postgraduate Program Universitas Negeri Makassar, Makassar, Indonesia

² Postgraduate Program Universitas Negeri Makassar, Makassar, Indonesia

³ Universitas Negeri Makassar, Makassar, Indonesia

⁴ Universitas Negeri Makassar, Makassar, Indonesia

*Corresponding author. E-mail: nurmalawahyuningsih@gmail.com

ABSTRACT

This study aims to determine the mathematics learning outcomes of students who are taught using the Team Assisted Individualization (TAI) type of cooperative learning model and the mathematics learning outcomes of students who are taught using conventional learning models. This type of research is quasi-experimental with a non-equivalent control group design. This research was conducted at SMA Negeri 18 Makassar in the 2019/2020 school year. Where is class XI. IPS 1 as the experimental class and class XI. IPS 2 as a control class. Data collection techniques include observation and test learning outcomes. The data analysis technique used descriptive analysis and inferential analysis with the help of the SPSS 20 for the windows program. Descriptive statistical analysis used is N-Gain with an average N-Gain score for mathematics learning outcomes of 0.76 for the experimental class. For the control class, an average N-Gain score for mathematics learning outcomes is 0.59. These results indicate that students who are taught using the Team Assisted Individualization type cooperative learning model (TAI) are higher than the mathematics learning outcomes of students taught using the conventional learning model. As for the analysis of the hypothesis test, used is the t-test (independent samples test) with a significance value of $0.0001 < 0.05$, which means reject H_0 and accept H_1 .

Keywords: Cooperative Learning Model Type Team Assisted Individualization (TAI), Mathematics Learning Outcomes.

1. INTRODUCTION

Education aims to develop the individual's potential, form a capable and creative personality, and fear God Almighty. This is in line with the Preamble to the 1945 Constitution, which is described more fully in Law no. 20 of 2003 concerning the national education system. It is stated that national education functions to develop capabilities and shape the character and civilization of a dignified nation in the context of educating the nation's life, aiming at developing the potential of students to become human beings who believe and fear God Almighty, have a noble character, healthy, knowledgeable, creative, independent, and become a democratic and responsible citizen so that education is expected to improve the welfare of human life [1].

The development of science, technology, and human culture in everyday life cannot be separated from the elements of mathematics, such as trade, painting, construction, astronomy, and others. The importance of mathematics cannot be separated from its role in aspects of life because mathematics is the mother of all sciences. Lestari [2] states that mathematics is one knowledge humans need in carrying out their daily lives. For example, when shopping, we need to choose and calculate the number of objects to be purchased and the price to be paid. When leaving, we need to remember the direction of the road where we are going, how long it is, and choose a faster way to get to our destination.

Given the importance of mathematics in everyday life, the government is trying to advance education,

especially mathematics, by including mathematics in the first National Science Olympiad (OSN) in Yogyakarta on September 10, 2002, until now [3]. However, the government's efforts to advance education, especially mathematics, have not produced optimal results. This can be seen from the low learning outcomes of students' mathematics. One indicator that shows that the quality of education in the country tends to be low is the result of international research on student achievement obtained through the TIMSS study (Trends In International Mathematics and Science Study) and the PISA (Program for International Student Assessment) study.

The TIMSS and PISA studies show that students' mathematical abilities in Indonesia are still below international standards. The results of the 2015 TIMSS study placed Indonesia at 44th out of 49 countries. Things that are not much different are shown from the results of the 2015 PISA study, which places Indonesia at 67th out of 74 countries [3].

In addition, a problem occurred in the results of the 2018 SMA National Examination (UN). The Ministry of Education and Culture in Awaliyah [4] stated a decrease in the National Examination (UN) average score for the SMA level or its equivalent in the 2017/2018 academic year. This decrease occurred in mathematics.

Suprayitno in Awaliyah [4] stated that the average value of the National Examination (UN) results for mathematics subjects for the science major high school level in 2018 reached 37.25. This figure has decreased by 4.67 compared to 2017, with an average value of 41.92. The decline in the value of the National Examination for Mathematics in the subjects of High School Social Studies in 2018 reached 4.73. This also happened at the high school level majoring in language. The decline in the UN scores for mathematics subjects reached 2.48.

In addition to the 2018 National Examination (UN) data at the SMA level above, students' low mathematics learning outcomes also occurred at SMA Negeri 1 Majene. This was obtained from the results of observations during the Field Experience Program (PPL) on October 1 to December 1, 2018, and from interviews with mathematics subject teachers for class XI IPS SMA Negeri from Majene, which was held from November 12 to 13, 2018 that the results of learning mathematics for class XI students IPS is still very low. It can be seen from the daily test scores, quizzes, and Final Semester Test scores (UAS), where there are still many students who have not reached the Minimum Completeness Criteria (KKM) set by the school, namely, 75.00. The provision of remedial does

not have a significant impact. Several factors can cause the low achievement of students' mathematics learning,

The other factor as the cause of the low student learning outcomes is the teacher's learning model that is not in accordance with the student's condition. Most of the learning models used by teachers are conventional learning. The application of conventional learning makes students not enthusiastic about participating in the learning process, which affects their learning outcomes.

Applying this conventional learning model also often makes students feel bored, bored, and passive in receiving subject matter so that the expected learning objectives cannot be achieved optimally [1]. Students are positioned as objects. Students are considered not to know or do not know anything. While the teacher positions himself as a person who knows, as the only source of knowledge, students are placed as learning objects that act as passive recipients of the information. Students are not allowed to develop their knowledge, making them not enthusiastic about participating in the learning process. So we need models, methods, approaches, even innovative, effective, and efficient learning strategies to overcome these problems. For that, we need a learning model that is expected to improve students' mathematics learning outcomes. In addition, it is also necessary to make students enthusiastic in participating in the learning process.

One innovative, effective, and efficient solution to overcome these problems is cooperative learning ([7]). Cooperative learning that teachers can use is the Team Assisted Individualization (TAI) type of cooperative learning with a quick on the draw strategy. It is also necessary to make students enthusiastic in participating in the learning process. One innovative, effective, and efficient solution to overcome these problems is cooperative learning [5]. Cooperative learning that teachers can use is the Team Assisted Individualization (TAI) type of cooperative learning with a quick on the draw strategy. It is also necessary to make students enthusiastic in participating in the learning process. One innovative, effective, and efficient solution to overcome these problems is cooperative learning [5]. Cooperative learning that teachers can use is the Team Assisted Individualization (TAI) type of cooperative learning with a quick on the draw strategy.

Slavin in Huda [6] states that Team Assisted Individualization (TAI) is a pedagogical program that seeks to adapt learning to the individual differences of students academically. As well as student motivation

by studying groups. On the other hand, using the quick on the draw strategy in learning mathematics is expected to eliminate students' boredom and boredom during the learning process. Students are motivated and enthusiastic in learning mathematics [1].

Researchers are interested in researching cooperative learning based on the description of the problem regarding students' low mathematics learning outcomes in class XI IPS SMA Negeri 18 Makassar. State 1 Majene.

2. RESEARCH METHOD

This research was conducted in class XI. Social Studies SMA Negeri 18 Makassar. The research was carried out within 1 month in the 2018/2019 academic year. The research method used in this study is experimental. In this research, the type of research is quantitative research in the form of quasi-experimental. There are 2 classes, namely the experimental class and the control class. The experimental class was given learning using a Team Assisted Individualization (TAI) cooperative learning model. The control class used a conventional learning model (direct learning) on integral algebraic function material. Furthermore, a pretest is given to each class before learning, and posttest is assigned to each class after the learning is done. The population in this study were all students of class XI. Social Studies SMA Negeri 18 Makassar for the 2018/2019 academic year consists of 2 classrooms, where all classes have the same level of ability that tends to be low-skill, with a total of 58 students.

In this study, the number of samples used was 58 students, namely 29 students for the experimental class and 29 students for the control class. The research instrument used is a test sheet and an observation sheet that has been tested for validity. The test sheet is used to measure the level of students' mathematics learning outcomes in the form of essays and observation sheets to determine student activities and the implementation of learning by the teacher during the learning process. The types and forms of questions between classes are the same. The data hypothesis test was carried out after testing the normality and homogeneity of the data on mathematics learning outcomes. Data analysis for testing the research hypothesis using parametric statistics with a significance level of 5%.

3. RESULTS AND DISCUSSION

3.1 Research Results

Descriptively, the data on students' mathematics learning outcomes in the experimental and control classes were taken from the pretest results given to a sample of 5 essay questions. Obtained data as follows:

Table 1. The results of the pretest experimental class and control class

Data	Experiment Class	Control Class
The highest score	48	43
Lowest Value	9	9
mean	25,8621	26
median	26	26
Mode	26	22
Standard Deviation	10,57532	8,94028
Variance	111,837	79,929

Source: Processed data

Based on the data above, it can be seen that the comparison of the descriptive values of the experimental class with the control class can be seen. Of the 29 experimental class students, the highest score obtained by students was higher than the score obtained by students in the control class, which also consisted of 29 students, the lowest score and median obtained were the same, the average value obtained by the experimental class was lower than the control class. Thus, it can be concluded that the results of the experimental class data have the same trend value as the control class. The data from the posttest results for the experimental class and the control class can be seen in the following table:

Table 2. The results of the posttest experimental class and control class

Data	Experiment Class	Control Class
The highest score	96	96
Lowest Value	61	48
mean	81.93	69.96
median	83	69

Mode	78	74
Standard Deviation	9,805	12,899
Variance	96.138	166.392

Source: Processed data

Based on the data above, the experimental class's average value (mean) is higher than the average value of the control class and the median and mode values. Thus, it can be concluded that the results of the experimental class data are better than the control class. The results of the normality test for the experimental class and control class can be seen in the following table:

Table 3. Normality test results

Class	Sample	Pretest	Posttest	Conclusion
		Significant	Significant	
Experiment	29	0.348	0.075	Normal
Control	29	0.501	0.530	Normal

Source: Processed data

Based on Table 3 above, the significant value obtained in all data is greater than the 0.05 significance level. Thus it can be concluded that the population data in both groups are normally distributed. The results of the homogeneous test of the data are as follows:

Table 4. Homogeneity Test Results

Mark	Significant	Conclusion
Pretest	0.355	Homogeneous
Posttest	0.085	Homogeneous

Source: Processed data

Based on Table 4 above, the significant value obtained for all data is greater than the 0.05 significance level. Thus it can be concluded that the two data have homogeneous variance.

After conducting the prerequisite test for data analysis, it was found that both groups were normally distributed and had homogeneous variance. Then tested the hypothesis with an independent sample t-test obtained criteria Sig <0.05, namely 0.001 <0.05, then H0 is rejected, and H1 is accepted. Thus it can be concluded that the mathematics learning outcomes of

class XI students. IPS SMA Negeri 18 Makassar uses the Team Assisted Individualization (TAI) Cooperative learning model, which is higher than the mathematics learning outcomes of class XI students. Social Studies SMA Negeri 18 Makassar uses a conventional learning model

3.2 Discussion

In this study, the author acts as an educator in implementing the Team Assisted Individualization (TAI) cooperative learning model in class XI IPS 1 SMA Negeri 18 Makassar as an experimental class. In comparison, in class XI IPS 2 SMA Negeri 18 Makassar as a control class, educators use conventional learning models (direct learning). During the teaching and learning process, the researcher was followed by 2 observers who were tasked with filling out the observation sheet given by the researcher at each meeting in the experimental and control classes. The observation sheet consists of two, namely the student activity observation sheet and the teacher's observation sheet on the implementation of learning.

Based on the results of observations of student activities observed by an observer for the experimental class at first to third meetings, they are included in the very good category, which means that during the learning process by applying the Team Assisted Individualization (TAI) cooperative learning model, student activities are very good. While the results of observing student activities for the control class at first to third meetings are included in the very good category, which means that student activities are very good during the learning process using the direct learning model.

The results of observations on the implementation of learning by teachers who were observed by an observer for the experimental class at first to third meetings were included in the very good category, which means that during the learning process, the teacher applied the Team Assisted Individualization (TAI) cooperative learning model very well. In contrast, the results of observations of the implementation of learning by teachers for the control class at first to third meetings are included in the very good category, which means that the teacher uses the direct learning model very well during the learning process.

Through the data from descriptive analysis with the help of the SPSS 20 application for the experimental class, the posttest average value of 81,9310 in the high category was obtained. As for the control class, the average posttest score was 69.9655 in the medium category. In addition, the results of the

descriptive analysis of the average N-Gain score of mathematics learning outcomes using the Team Assisted Individualization (TAI) cooperative learning model are $0.76 > 0.59$ the average N-Gain score of mathematics learning outcomes using conventional learning models (direct learning).

Based on hypothesis testing with the help of the SPSS 20 application, the significance value for the posttest experimental class and control class is 0.0001, which is smaller than the 0.05 significance level, which means that the average value of the experimental class is higher than the average value of the control class after being given treatment. . This shows that H1 is accepted and H0 is rejected, which means that the mathematics learning outcomes of students who are taught using the Team Assisted Individualization (TAI) cooperative learning model is higher than the mathematics learning outcomes of students who are taught using conventional learning models.

The results of this study are in line with the results of previous research by Natali and Leonard [5], showing that the Team Assisted Individualization (TAI) type of cooperative learning method influences mathematics learning outcomes for students of SMK Darul Ma'arif Jakarta. The same thing was also shown by Afifah et al. [7] that the TAI effectively improves students' mathematics learning achievement. In addition, the results of research by Amrulloh (2012) show a significant effect of the quick on the draw learning strategy on the mathematics learning outcomes of eighth-grade students of SMP Negeri 2 Bandung in the 2011/2012 academic year.

There is a high increase in learning outcomes in classes that apply the Team Assisted Individualization (TAI) cooperative learning model because this method aims to increase students' knowledge, abilities, and motivation. Slavin in Huda [6] states that Team Assisted Individualization (TAI) is a pedagogical program that seeks to adapt learning to the individual differences of students academically. As well as student motivation by studying groups.

Based on the above, it can be concluded that the Team Assisted Individualization (TAI) cooperative learning model can be applied in the learning process, which aims to increase student's knowledge, abilities, and motivation in learning to enable the improvement of students' mathematics learning outcomes.

4. CONCLUSION

Based on the results of research and discussion that have been stated, it can be concluded that. Mathematics learning outcomes of students who are taught using the Team Assisted Individualization (TAI) cooperative learning model are higher than the mathematics learning outcomes of students who are taught using conventional learning models.

REFERENCES

- [1] Huriyanti, Rosiyanti, 2017. Perbedaan Motivasi Belajar Matematika Siswa setelah menggunakan Strategi Pembelajaran Quick on the Draw, FIBONACCI: Jurnal Pendidikan Matematika dan Matematika Volume 3 No. 1.
- [2] Lestari KW. 2011. Konsep Matematika Untuk Anak Usia Dini. Jakarta: Direktorat Jenderal Pendidikan Anak Usia Dini Kementrian Pendidikan Nasional.
- [3] Murtafiah, Nursafitri, 2018. "Pengaruh Gaya Kognitif dan Gender Terhadap Kemampuan Pemecahan Masalah Matematika ". Jurnal JPPM, 11, 1, hal. 75-82.
- [4] Awaliyah, Gumanti. 2018. Kemendikbud: Rerata UN Matematika SMA Turun. Diakses tanggal 14 Januari 2018, dari <https://republika.co.id/berita/pendidikan/eduacti on/18/05/08/p8f0zb428kemendikbud-rerata-un-matematika-sma-turun>.
- [5] Natali dan Leonard. 2015. "Pengaruh Metode Pembelajaran Team Assisted Individualization Terhadap Hasil Belajar Matematika pada Sekolah Menengah Kejuruan Darut Ma'arif Jakarta".Jurnal Pendidikan , hal. 203-210.
- [6] Huda, Miftahul. 2016. Model-Model Pengajaran dan Pembelajaran. Jakarta: Pustaka Pelajar.
- [7] Afifah, Isnani, 2019. *The Effect of Team Assisted Individualization Instructional Strategies to Enhance Problem Solving Ability, Learning Activity, and Mathematics Learning Achievement*. Journal of Progressive Education. [Vol 9, No 1 \(2019\)](http://dx.doi.org/10.23960/jpp.v9.i1.201904). DOI: <http://dx.doi.org/10.23960/jpp.v9.i1.201904>