



Jurnal Review Pendidikan dan Pengajaran  
<http://journal.universitaspahlawan.ac.id/index.php/jrpp>  
 Volume 6 Nomor 2, 2023  
 P-2655-710X e-ISSN 2655-6022

Submitted : 04/08/2023  
 Reviewed : 11/08/2023  
 Accepted : 12/08/2023  
 Published : 22/08/2023

Rifdania Deviany  
 Lohonauman<sup>1</sup>  
 Ichdar Domu<sup>2</sup>  
 Vivian E. Regar<sup>3</sup>  
 Navel Oktaviandy  
 Mangelep<sup>4</sup>

## IMPLEMENTATION OF THE TAI TYPE COOPERATIVE LEARNING MODEL IN MATHEMATICS LEARNING SPLDV MATERIAL

### Abstrak

Dalam penelitian ini siswa kelas VIII SMP Negeri 1 Modayag Barat dipaparkan pada materi SPLDV dengan menggunakan model pembelajaran kooperatif terhadap TAI. Kedua kelompok dalam penelitian ini menggunakan desain kelompok kontrol non-ekuivalen yang dipilih tanpa menggunakan seleksi acak. Untuk mengetahui kondisi baseline dan tingkat pemahaman materi SPLDV serta baseline kemampuan matematika, dilakukan pretest pada kedua kelompok. Siswa kelas VIII A dan VIII B menjadi sampel penelitian sebanyak 40 siswa. Tes adalah instrumen yang digunakan. Statistik deskriptif dan statistik inferensial digunakan dalam proses analisis data. Berdasarkan hasil penelitian, rata-rata hasil belajar siswa pada pretest kelas eksperimen sebesar 34, sedangkan pada kelas kontrol sebesar 32,9. Pada kelas eksperimen rata-rata hasil belajar setelah menggunakan model pembelajaran kooperatif tipe TAI sebesar 82,3, sedangkan pada kelas kontrol rata-rata hasil belajar setelah diterapkan model pembelajaran ekspositori sebesar 75,1.  $H_0$  Ditolak dapat disimpulkan dari temuan analisis inferensial bahwa  $t_{hitung} > t_{tabel}$  ( $2,4 > 1,70$ ). Akibatnya terdapat kesenjangan antara hasil belajar matematika materi SPLDV siswa yang memperoleh pembelajaran menggunakan model pembelajaran kooperatif terhadap TAI dengan yang memperoleh pembelajaran menggunakan pendekatan pembelajaran ekspositori. Studi ini menunjukkan bagaimana teknik pembelajaran kooperatif seperti TAI dapat meningkatkan kinerja akademik siswa secara signifikan.

**Kata Kunci:** Model Pembelajaran, Kooperatif Tipe TAI, Matematika, SPLDV

### Abstract

In this study, eighth-grade students at SMP Negeri 1 Modayag Barat are exposed to SPLDV material while using a cooperative learning methodology akin to TAI. Two groups in this study's non-equivalent control group design were chosen without the use of random selection. To ascertain the baseline condition and level of comprehension of the SPLDV material as well as the baseline proficiency in mathematics, pretests were administered to both groups. Students from grades VIII A and VIII B made up the study's 40-student sample. A test is the instrument in use. Both descriptive statistics and inferential statistics are employed in the data analysis process. According to the study's findings, the experimental class's average student learning outcomes on the pretest were 34, whereas the control class' were 32.9. In the experimental class, the average learning

<sup>1</sup> Program Studi Pendidikan Matematika, FMIPAK, Universitas Negeri Manado  
 Rifdaniadeviany10@gmail.com

<sup>2</sup> Program Studi Pendidikan Matematika, FMIPAK, Universitas Negeri Manado  
 ichdardomu@unima.ac.id

<sup>3</sup> Program Studi Pendidikan Matematika, FMIPAK, Universitas Negeri Manado  
 vivianregar@unima.ac.id

<sup>4</sup> Program Studi Pendidikan Matematika, FMIPAK, Universitas Negeri Manado  
 navelmangelep@unima.ac.id

outcomes after using the TAI-type cooperative learning model were 82.3, while in the control class, the average learning outcomes after applying the expository learning model were 75.1.  $H_0$  Rejected can be deduced from the inferential analysis's findings that  $t_{\text{count}} > t_{\text{table}}$  ( $2.4 > 1.70$ ). As a result, there are discrepancies between the mathematical learning outcomes of SPLDV material for students who receive instruction using a cooperative learning model akin to TAI and those who receive instruction using an explanatory learning approach. This study demonstrates how cooperative learning techniques such to tai may significantly enhance students' academic performance.

**Keywords:** Learning Model, TAI Type Cooperatif, Mathematics, SPLDV

## INTRODUCTION

Mathematics has an essential role in the development of science and technology, so mathematics is one of the subjects that needs to be studied in the 2013 curriculum. This follows what was stated by Haryono (2014), that mathematics as the queen of sciences shows its role as the parent or basis of science, so it can be said that in this modern era, both the fields of medicine, biology, social, economic, and business, chemistry, physics, and other sciences continue to study mathematics as a support or basis for the development of their knowledge.

Mathematics is known as a subject that is difficult to learn and is always avoided by some students. Some of the reasons students do not like mathematics are that students have to operate so many numbers (Nisa & Vebrianto, 2021), memorize and use formulas (Arifah & Saefudin, 2017), and students must solve math problems in the form of stories (Kahar & Layn, 2017). The material in mathematics subjects usually uses word problems, namely, sets, systems of linear equations, arithmetic, and some other material (Luthfia & Zanthly, 2019). For this reason, an appropriate learning model is needed according to the existing material.

A preliminary study at West Modayag 1 Public Middle School for two days showed that the teaching methods used by teachers needed to be more diverse. The first step in learning is describing the material and giving examples of problems and solutions. After that, the teacher instructs the class to record the material that has been given. Package book practice questions will then be given. Most of the children's learning still comes from the teacher. When working on practice questions, most students often visit the benches of more brilliant classmates to get answers; Only a small number of students diligently work on the questions. None of the students answered when the teacher asked how challenging the previous material was for them. They do not give opinions or ask questions. In addition, even though the lesson to be delivered by the teacher is a continuation of the previous lesson, students often need to remember it. As a result, students are unlikely to understand the topic. The teacher's method is not repeated, so students easily forget what has been taught.

The learning that has been carried out by the mathematics teacher in class VIII SMP Negeri 1 West Modayag is classical learning with an expository learning model, where the standard score for learning mathematics is 75. Out of a total of 96 students, it is known that out of a total of 96 students, 27 students got grades above KKM, while 69 students scored below KKM, so it was concluded that learning mathematics was not practical.

Researchers also obtained information from mathematics teachers who stated that students had problems solving System of Two Variable Linear Equations (SPLDV) problems, especially in terms of substitution, which is the first step in solving problems, where many students were found to be confused in changing questions that were substituted into equations. Therefore, learning model problems related to student learning outcomes and learning time will be examined in this study.

This follows the findings of an interview conducted by the researcher on August 16, 2021, which revealed that students only actively recorded material according to what was assigned or written by the teacher on the blackboard. As a result, only students with a high level of understanding can absorb lessons effectively. However, the other children obeyed the teacher's instructions. The impact is that student learning outcomes are not as expected, namely not achieving KKM and the goals of learning mathematics with the K-13 curriculum are not achieved,

where according to the K-13 curriculum, the goals of learning mathematics are: 1) improving students' intellectual abilities, 2) problem-solving skills, 3) high learning outcomes, 4) practice communicating, and 5) developing student character (Mulyadin & Riyadi, 2018; Dahlan et al., 2019; Kurniawan et al., 2021).

Cooperative learning models or cooperative learning can be used as an alternative to overcome the above problems; one type of cooperative learning Team Assisted Individualization (TAI). The Team Assisted Individualization (TAI) cooperative learning model is a learning model that combines cooperative learning with individual teaching programs (Achdiyat & Andriyani, 2016; Cahyaningsih, 2018; Ramadhadi & Azis, 2020). Using this learning model can improve student learning outcomes and motivation so that the goals of learning mathematics, especially SPLDV material, can be achieved with high learning outcomes (Sutriningsih et al., 2018; Saman & Tiro, 2019; Wali et al., 2020).

Based on the description above, this research was carried out under the title: TAI Type Cooperative Learning Model in Mathematics Learning SPLDV System Material.

## METHOD

This type of research is a type of experiment (quasi-experiment). The control class and the experimental class are the two classes used in this study. Expository learning is used in the control class, while TAI is used in the experimental class for learning. This research is experimental research with two groups or classes. The Non-equivalent Control Group Design is the research methodology used. Even though this design includes a control group, it is impossible to completely control for outside factors that influence how the experiment is conducted. There will be two groups randomly selected in this investigation. A pretest was then given to both to ascertain the initial state and differences between the experimental and control groups. If there is no significant difference between the values of the experimental group and the control group, then the results of the pretest are declared successful.

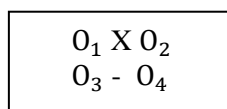


Figure 1. Non-equivalent Control Group Design

Information:

X = Treatment in class in the form of the TAI-type cooperative learning model

- = learning model that is not the same as the experimental class

O<sub>1</sub> = Experimental class pretest results

O<sub>2</sub> = Results of the experimental class posttest

O<sub>3</sub> = Control class pretest results

O<sub>4</sub> = Results of the control class posttest

The population in this study were students of class VIII SMP Negeri 1 West Modayag, consisting of seven classes with a total of 203 students. The sample in this study was students of class VIII SMP Negeri 1 West Modayag, which only consisted of two classes. The two sample groups in this study were students in class VIII A as the control class, with 20 students, and students in class VIII B as an experimental class, with 20 students. The data collection technique in this study is a test. The tests in this study were used to collect information about student learning outcomes. Tests are the primary tool of research. Data on students' mathematics learning outcomes were collected through tests. The researcher made the final test of learning outcomes (posttest). There are six questions on the description test in the form of a test. The validity and reliability of the tests created will then be examined.

## RESULT AND DISCUSSION

The research was conducted at West Modayag 1 Public Middle School from April 22, 2022, to May 25, 2022. This study used a non-equivalent control group design, a kind of quasi-experimental research with a control group. However, it cannot adequately control external factors that affect the experiment. This research was conducted in two classes, namely the control class applying the Expository learning model and the experimental class applying the TAI Type Cooperative learning model in SPLDV material in class VIII, with the number of each class being 20 students, totalling 40 students. Then, the researchers used descriptive statistical analysis and inferential statistical analysis. Researchers investigated differences in mathematics learning outcomes in SPLDV material using data collection techniques in the form of tests to determine the learning outcomes achieved by students in each class studied. There are differences in student learning outcomes in the experimental and control classes after the learning model is applied, with the control class average score of 75.1 and the experimental class score of 82.3.

### 1. Normality Test

The normality test was carried out on the pretest and posttest results of the experimental and control classes using the Kolmogrov-Smirnov Test with a significant level ( $\alpha$ ) = 0.05 with the help of SPSS Ver 21. The data is normally distributed if (sig.) > 0.05.

- 1) Test the normality of the pretest and posttest of the experimental class.

Table 1. Normality Test of Pretest and Posttest Data for Experimental Class

<i>Experiment Class</i>	<i>Pretest</i>	<i>Posttest</i>	<i>Information</i>
<i>Sig. (2-tailed)</i>	<i>0,078</i>	<i>0,966</i>	<i>Normal</i>

Source: Experimental Class Pretest and Posttest Data (SPSS Ver 21 for Windows)

Based on Table 1 above, the significant value is greater than  $\alpha$  ( $0.078 > 0.05$ ) and  $\alpha$  ( $0.955 > 0.05$ ), so it can be said that the pretest and posttest data for the experimental class are normally distributed.

- 2) Normality test pretest and posttest control class

Table 2. Normality Test of Control Class Pretest and Posttest Data

<i>Control Class</i>	<i>Pretest</i>	<i>Posttest</i>	<i>Information</i>
<i>Sig. (2-tailed)</i>	<i>0,388</i>	<i>0,627</i>	<i>Normal</i>

Source: Control Class Pretest and Posttest Data (SPSS Ver 21 for Windows)

From the table above, it is significantly greater than  $\alpha$  ( $0.388 > 0.05$ ) and  $\alpha$  ( $0.627 > 0.05$ ), so it can be said that the pretest and posttest data for the control class are normally distributed.

### 2. Homogeneity Test

The homogeneity test is the second prerequisite after the normality test, which helps to know whether the research was conducted from the same population. The criteria for testing a homogeneous population are if the significant number (Sig.) < 0.05 and not homogeneous if (Sig.) > 0.05.

Table 3. Pretest and Posttest Data Homogeneity Test of Control Class and Experimental Class

<i>Coopertive Script dan Artikulasi</i>	<i>Pretest</i>	<i>Posttest</i>	<i>Information</i>
<i>Sig. (Sig.)</i>	<i>0,065</i>	<i>0,230</i>	<i>Homogen</i>

Source: Control Class Pretest and Posttest Data (SPSS Ver 21 for Windows)

The table above shows that the pretest data's significant value is 0.065, and the significant value of the posttest data is 0.230. The values obtained are more significant than  $\alpha$ , namely ( $0.065 > 0.05$ ) and ( $0.230 > 0.05$ ), so it can be concluded that the data is homogeneous.

Based on the research results, the researchers collected data through test instruments. They obtained data on the learning outcomes of SMP Negeri 1 West Modayag class VIII students. The value of the pretest results of the experimental and control classes before the TAI Type Cooperative learning model was applied still needs to be corrected, with the lowest score in the experimental class being 20 and the highest score being 70. Then, the lowest score in the control class is 10, and the highest value is 75. The pretest results obtained by researchers have yet to implement the TAI-type cooperative learning model in both classes. The experimental and control class pretest results are presented in Table 4.

Table 4. Descriptive Statistical Value of Experimental Class and Control Class Pretest Results

Statistic	Statistic Value	
	Experiment Control	Control Class
<b>Lowest Value</b>	20	10
<b>Higher Value</b>	70	75
<b>Average (<math>\bar{X}</math>)</b>	34	32,9

Source: Data calculated by researchers

Based on the pretest results of the experimental class and the control class, with the average gain of the experimental class being 34 and the control class being 32.9, it shows that the results obtained show the average ability level of mathematics learning outcomes in both classes before being given treatment to obtain an average value which is almost the same, it can be seen that the control class has an average value slightly higher with a difference of 1.1. Thus, the two sample classes show almost no difference in mastery of the material before treatment by applying the TAI-type cooperative learning model. For more details, it can be seen in Figure 2 below:

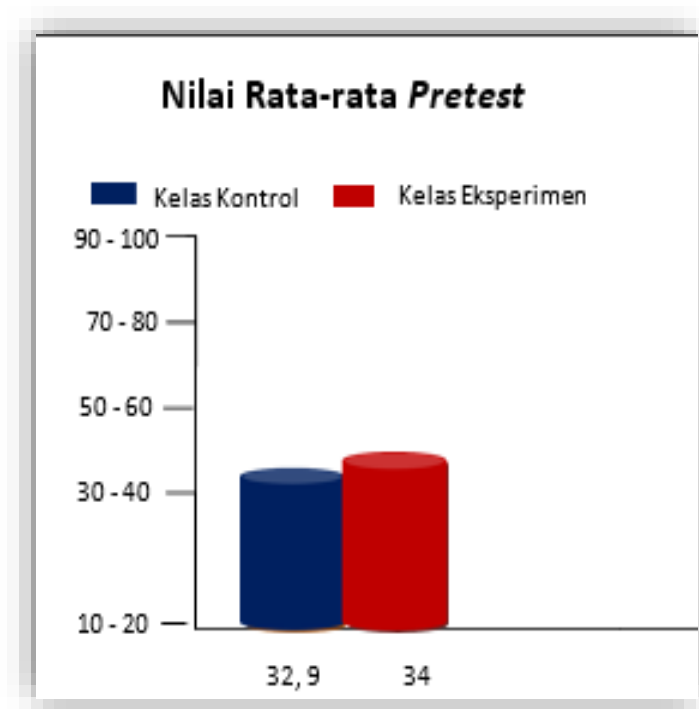


Figure 2. Average Pretest Scores for the Experimental Class and the Control Class

The following are the learning outcomes of class VIII students of SMP Negeri 1 West Modayag after being given treatment by applying the TAI-type cooperative learning model in the experimental class and the Expository learning model in the control class, the mathematics learning results obtained in this section are based on the posttest given to the experimental class and the control class found that the lowest posttest score in the experimental class that was treated with the application of the TAI type cooperative learning model was 66 and the highest was 98. Then, the posttest value in the control class treated by applying the Expository learning model got the lowest score of 60 and the highest score of 100. Class post-test results of the experimental and control classes are presented in Table 5.

Table 5. Descriptive Statistical Values of Posttest Experiment Class and Control Class Results

Statistic	Statistic Value	
	Experiment Class	Control Class
<b>Lowest Value</b>	66	60
<b>Higher Vale</b>	98	100
<b>Average (<math>\bar{X}</math>)</b>	82,3	75,1

Source: Data calculated by researchers

Based on the posttest results of the experimental class and control class, the average acquisition of the experimental class was 82.3. The control class was 75.1, indicating that the results obtained showed the average ability level of mathematics learning outcomes in both classes after being given treatment to obtain an average. The average value is different. The experimental class has a much higher average than the control class, with a difference of 7.1.

The following figure clarifies the differences in the average post-test scores obtained by students in the experimental and control classes.

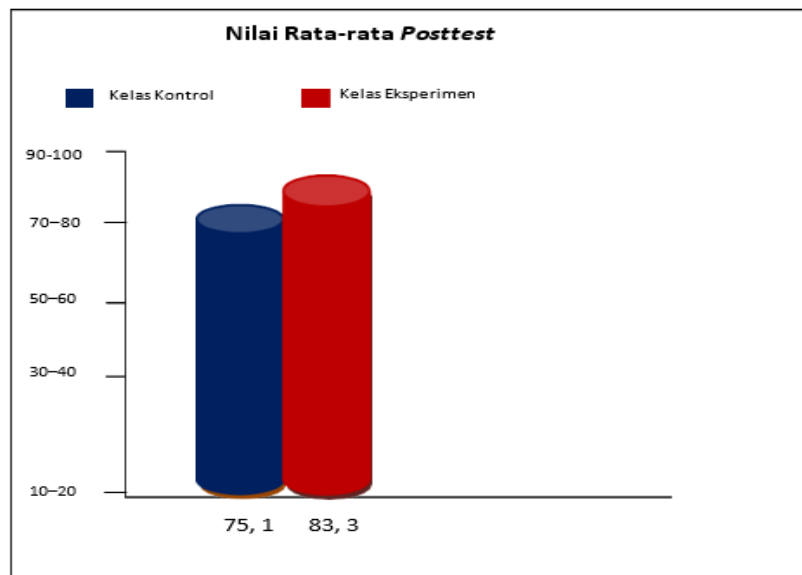


Figure 3. Posttest Average Value of Experimental Class and Control Class

Figure 3 above shows that the posttest results of experimental class students are higher than those in the control class and have increased compared to the results obtained in the pretest, as can be seen in the following figure:

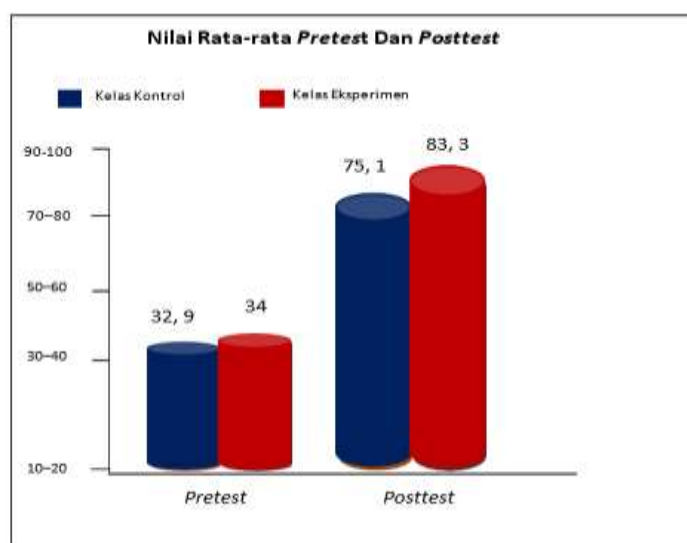


Figure 4. Average pretest and posttest scores for the experimental class and the control class

Thus, this shows that mastery of the material after being given treatment by applying the TAI-type cooperative learning model in the experimental class has increased from the pretest results than the application of the Expository learning model in the control class, which has also increased. However, the average value obtained is still below the class experiment.

The implementation of the Team Assisted Individualization (TAI) cooperative learning model in learning mathematics on the material of the Two-Variable Linear Equation System (SPLDV) in class VIII students of SMP Negeri 1 West Modayag resulted in an average different learning outcome in the two classes that were used as research samples, namely class VIII A (control class) and VIII B (experimental class). The researcher applied the Assisted Individualization (TAI) cooperative learning model for the experimental class. The researcher applied the expository learning model for the control class, also used by mathematics teachers at SMP Negeri 1 Modayag Barat.

The results of the descriptive analysis showed that: 1) in the experimental class, the average pretest was 34 (very low), with the lowest score being 20 and the highest score being 70, then for the control class, the pretest average was 32.9 with the lowest score being 10 and the highest score was 75, the mathematics learning outcomes of class VIII students of SMP Negeri 1 West Modayag on the pretest showed a slight difference in learning outcomes between the experimental class and the control class with a difference of 1.1 which showed that before being given treatment, the level of understanding of mathematics in both classes was almost the same, 2) the average posttest score of the experimental class was 82.3 (very good) with the lowest score being 66 and the highest score being 98, then for the posttest average of the control class was 75.1 with the lowest score being 66 and the highest score being 100.

The achievement of mathematics learning outcomes for SPLDV material after being given the highest score (posttest) in the control class was more than 100, and in the experimental class, 98; even so, the average student learning outcomes in the experimental class were much higher than the control class with a difference of 7.1.

After the treatment given to the experimental class, namely by applying the TAI-type cooperative learning model, it can effectively improve student mathematics learning outcomes, which in this study was devoted to SPLDV material. The learning outcomes obtained by students are due to the activities of students who are more active than the teacher so that knowledge and skills are obtained in the teaching and learning process, which creates a more comfortable and new learning atmosphere in the classroom.

In applying the TAI-type cooperative learning model, the teacher acts as a facilitator and moderator for students during learning; this can be seen when the research was carried out where the treatment of students who were taught using this learning model was more enthusiastic than students who were taught using the expository learning model.

In the experimental class, students with higher mathematical abilities help their friends solve the problems given so that there is good communication between students in the group. In contrast to the control class, which was taught using an expository learning model, which focused more on student activity on the teacher, it can be seen when students in the control class vacuum listened to the material presented by the teacher, so they were less active in learning. Lack of student activity in learning will reduce student enthusiasm, ultimately impacting learning outcomes.

This research is supported by the theory of Robert Slavin, who says that the TAI-type cooperative learning model is one of the learning models that uses heterogeneous groups and works together in groups to solve problems.

The research results are supported by the acquisition achieved by students after being taught using the TAI-type cooperative learning model. When students are divided into several homogeneous groups, it is found that students are more enthusiastic about learning and motivated to solve problems given by the teacher by working to form good cooperation in each group. These results are in line with the theory put forward by Robert Slavin. Namely, cooperative learning makes students work in small groups to help each other learn the subject matter. Thus, in this study, the results of students' mathematics learning, especially SPLDV material, experienced an increase.

The research results described above show that applying an active learning model can change the learning atmosphere to become more active. It is proven that presenting the same material by applying different learning models can produce different learning outcomes, and then applying the suitable learning model can produce very satisfying understanding and learning outcomes. For this reason, the teacher needs to apply a new and appropriate learning model to achieve satisfactory learning outcomes for students.

## CONCLUSION

Based on the results of the research, the application of the TAI-type cooperative learning model is more effective in learning mathematics SPLDV material than the Expository learning model to improve student learning outcomes in class VIII SMP Negeri 1 West Modayag. The increased learning outcomes of students' evidence this taught using the TAI cooperative learning model 82.3, higher than those taught using the expository learning model 75.1, with a difference in learning outcomes 7.2.

## REFERENCES

- Achdiyat, M., & Andriyani, F. (2016). Hasil belajar matematika ditinjau dari model pembelajaran Teams Assisted Individualization (TAI). *Formatif: Jurnal Ilmiah Pendidikan MIPA*, 6(3).
- Arifah, U., & Saefudin, A. A. (2017). Menumbuhkembangkan kemampuan pemahaman konsep matematika dengan menggunakan model pembelajaran guided discovery. *Union: Jurnal Pendidikan Matematik*, 5(3), 263-272.
- Cahyaningsih, U. (2018). Penerapan model pembelajaran kooperatif tipe TAI (team assisted individualization) untuk meningkatkan hasil belajar siswa pada mata pelajaran matematika. *Jurnal Cakrawala Pendas*, 4(1).
- Dahlan, S., Sari, R., & Mansor, R. (2019). Kompetensi pedagogik: Sebuah tinjauan tentang internalisasi nilai-nilai karakter pada pembelajaran matematika SD. *Suska Journal of Mathematics Education*, 5(1), 9-18.
- Haryono, D. (2014). *Filsafat Matematika (Suatu Tinjauan Epistemologi dan Filosofis)*.
- Kahar, M. S., & Layn, M. R. (2017). Analisis kesalahan siswa dalam menyelesaikan soal cerita matematika. *Jurnal Math Educator Nusantara: Wahana Publikasi Karya Tulis Ilmiah Di Bidang Pendidikan Matematika*, 3(2), 95-102.
- Kurniawan, I., Abdillah, R., & Rahadyan, A. (2021). Sosialisasi Penerapan Metode Pembelajaran Steam Pada Kurikulum K-13. *Indonesian Journal Of Community Service*, 1(4), 687-693.



- Luthfia, L., & Zanthi, L. S. (2019). Analisis kesalahan menurut tahapan kastolan dan pemberian scaffolding dalam menyelesaikan soal sistem persamaan linear dua variabel. *Journal on Education*, 1(3), 396-404.
- Mulyadin, E., & Riyadi, K. (2018). Implementasi Kurikulum 2013 (K-13) dengan Pendekatan Saintifik (Metode 5M) Terhadap Siswa pada Mata Pelajaran Matematika di SMA/MA Negeri Kec. Sape. *JEMS: Jurnal Edukasi Matematika dan Sains*, 6(2), 103-112.
- Nisa, A., MZ, Z. A., & Vebrianto, R. (2021). Problematika Pembelajaran Matematika di SD Muhammadiyah Kampa Full Day School. *El-Ibtidaiy: Journal of Primary Education*, 4(1), 95-105.
- Ramadhani, K., & Azis, Z. (2020). Efektivitas Model Pembelajaran Tipe Team Assisted Individualization (TAI) Terhadap Hasil Belajar Matematika Pada Siswa SMK PAB 2 Helvetia Medan TP 2019/2020. *Journal Mathematics Education Sigma [JMES]*, 1(1), 34-40.
- Saman, S., & Tiro, A. (2019). Pengembangan Video Pembelajaran Matematika Dalam Meningkatkan Minat Dan Prestasi Belajar Siswa Pada Materi Persamaan Linear Dua Variabel. *Pedagogy: Jurnal Pendidikan Matematika*, 4(1), 1-12.
- Sutriningsih, N., Pratiwi, R., & Utami, B. H. S. (2018). Penerapan model pembelajaran kooperatif tipe numbered head together (NHT) pada materi sistem persamaan linear dua variabel (SPLDV). *JURNAL e-DuMath*, 4(2), 11-20.
- Wali, G. N. K., Winarko, W., & Murniasih, T. R. (2020). Peningkatan keaktifan dan hasil belajar siswa dengan penerapan metode tutor sebaya. *RAINSTEK: Jurnal Terapan Sains & Teknologi*, 2(2), 164-173.