

THE INFLUENCE OF TGT COOPERATIVE LEARNING ASSISTED BY WORDWALL ON STUDENTS' LEARNING OUTCOMES IMPROVEMENT

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ABSTRACT

This research is motivated by the low mathematics learning outcomes of students caused by the lack of variation in models and learning media used by teachers. The purpose of this study was to determine the influence, magnitude of influence, improvement and magnitude of improvement in student learning outcomes through the application of the TGT (Team Games Tournament) type cooperative learning model assisted by wordwall media. This study used a quantitative approach with a quasi-experimental design, specifically a pretest-posttest control group design. The sample consisted of two classes, namely class VIII-C as the experimental class and class VIII-F as the control class and sampling using random sampling techniques. Data collection techniques used in the form of pretest and posttest essay tests. Data analysis using the t-test to determine the difference in learning outcomes between the experimental and control classes, the effect size test to determine the magnitude of the effect of the treatment, and the N-Gain test used to measure the magnitude of the increase in learning outcomes. The results of this study indicate a significant influence with an effect size value of 0,39% indicating a high influence and an N-Gain of 0.719246 shows that there is a significant increase for the experimental class. Thus, the cooperative learning model of the TGT (Team Games Tournament) type assisted by wordwall media has proven to be influential and effective in improving mathematics learning outcomes significantly.

Keywords: learning outcomes, mathematics, team games tournament, wordwall.

ABSTRAK

Penelitian ini dilatarbelakangi oleh rendahnya hasil belajar matematika siswa yang disebabkan oleh kurangnya variasi model dan media pembelajaran yang digunakan oleh guru. Tujuan dari penelitian ini adalah untuk mengetahui pengaruh, besarnya pengaruh, peningkatan dan besarnya peningkatan hasil belajar siswa melalui penerapan model pembelajaran kooperatif tipe TGT (Team Games Tournament) berbantuan media wordwall. Penelitian ini menggunakan pendekatan kuantitatif dengan desain kuasi eksperimen, khususnya pretest-posttest control group design. Sampel terdiri dari dua kelas, yaitu kelas VIII-C sebagai kelas eksperimen dan kelas VIII-F sebagai kelas kontrol dan pengambilan sampel menggunakan teknik random sampling. Teknik pengumpulan data yang digunakan berupa tes essay pretest dan posttest. Analisis data menggunakan uji-t untuk mengetahui perbedaan hasil belajar antara kelas eksperimen dan kelas kontrol, uji effect size untuk mengetahui besarnya pengaruh perlakuan, dan uji N-Gain yang digunakan untuk mengukur besarnya peningkatan hasil belajar. Hasil penelitian ini menunjukkan adanya pengaruh yang signifikan dengan nilai effect size sebesar 0,39% yang menunjukkan pengaruh yang tinggi dan N-Gain sebesar 0,719246 menunjukkan adanya peningkatan yang signifikan untuk kelas eksperimen. Dengan demikian, model pembelajaran kooperatif tipe TGT (Team Games Tournament) berbantuan media wordwall terbukti berpengaruh dan efektif dalam meningkatkan pembelajaran matematika.

Kata Kunci: hasil belajar, matematika, team games tournament, wordwall



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Introduction

The development of Science and Technology (IPTEK) in the 21st century has had a major influence in various fields, including education (Mulyani F & Haliza N, 2021). In education, technology is utilized not only as a learning tool, but also as a strategy to improve the quality and effectiveness of the learning process. Educational technology includes the use of digital devices, interactive applications, and learning platforms that create an interactive atmosphere between teachers and students in a more varied and interesting way (Dwita & Zulfitria, 2024). This digital transformation has changed the way teachers deliver material and how students understand learning, which is no longer limited to physical classrooms, but can take place in adaptive virtual spaces. Teachers in this era are required to be able to integrate technology to enrich students' learning experiences (Purba et al., 2024).

(Khalil et al., 2024) One of the main goals of education is to develop individual potential, including through mastery of mathematics. Mathematics is an abstract science that is closely related to everyday life and is important in developing students' logical thinking (Dewi et al., 2024) (Susanti et al., 2024). However, in practice, math is often one of the subjects that is difficult for many students to understand (Oktaviasari et al., 2024), (Kamarullah, 2017) Many of them find math daunting because it is filled with formulas and abstract concepts, so their motivation to learn this subject tends to be low (Alima & Sulistyowati, 2024)

From observations made in class VIII UPT SMP Negeri 5 Tuban during Teaching Assistance activities, several problems were found that had an impact on the low learning outcomes of students, especially in the field of mathematics. The learning model used is still conventional with the lecture method and the teacher as the center of learning activities. Limitations in the use of varied learning models and media have an impact on students feeling bored, less interested, and passive in participating in learning. The lack of attractiveness in learning can directly affect students' enthusiasm and learning outcomes (Nabillah & Abadi, 2019). Although many strategies have been implemented to improve and enhance the quality of learning, low learning outcomes are still a challenge in many schools. This is due to the use of learning models that are less varied and lack active involvement from students (Ratno et al., 2024)

These problems indicate the need for the application of innovative, interactive, and fun learning models and media. The selection of effective learning methods plays an important role in improving students' understanding of the material and encouraging interest in learning mathematics. (Alima & Sulistyowati, 2024). One of the learning models that can be used is the Team Games Tournament (TGT) type cooperative model. According to (Prasetya & Agustika, 2023), TGT is group learning that involves all students regardless of ability differences, and combines elements of collaboration, healthy competition, and educational games (Nopiyanti et al., 2024). This model aims to increase student participation, create a fun learning atmosphere, and facilitate understanding of mathematical concepts. Thus, the application of TGT is considered appropriate to overcome these problems. To be more optimal (Asjudirja, DH & Ulia, 2025), the application of TGT can be combined with the utilization of technological media that supports learning activities, such as the use of Wordwall.

Wordwall is a web-based media that provides various interactive game templates for learning activities (Nenohai et al., 2021). This media allows teachers to present material in a more varied and interesting way (Purnamasari et al., 2020). (Aliatunisa, 2024) With Wordwall, teachers can create quizzes, crossword puzzles, or other games that are competitive but educational, so that math learning becomes more dynamic and fun. The interactive features in Wordwall help students to be more focused, active, and motivated to learn (Nisa & Susanto, 2022), (Kusnadi, 2024). Media development can improve learning outcomes (Sari et al., 2025). In addition, in the context of implementing the TGT model, Wordwall can be used as a group game media at the game and tournament stages. So that students are encouraged to work together, discuss and interact with their groups and with other groups. Thus, the integration of Wordwall in TGT not only increases learning motivation, but also strengthens cooperation and social interaction between students.

Based on this background, the researcher is interested in conducting a study entitled "The Effect of TGT (Team Games Tournament) Cooperative Learning Model Assisted by Wordwall on Improving Mathematics Learning Outcomes of Junior High School Students" This study aims to determine the extent of the application of the TGT model assisted by Wordwall in improving student math learning outcomes.

Research Method

This research was conducted quantitatively with the Quasi-experiment method using a pretest-posttest control group design (Waruwu et al., 2025). The subjects of this study were VIII grade students at UPT SMP Negeri 5 Tuban. The selection of experimental class (VIII-C) and control class (VIII-F) was done through cluster random sampling technique. The experimental class was treated with TGT (Team Games Tournament) type cooperative learning model assisted by wordwall media, while the control class used conventional learning.

This study uses quantitative data in the form of student learning outcomes scores obtained from pretest and posttest tests. The data source is primary data obtained directly from the test results of the two classes. The research instrument is a seven-item pretest and posttest description test. This instrument has been validated by experts and tested for validity and reliability using SPSS. Data analysis techniques include normality and homogeneity tests to determine the type of hypothesis test used. The Independent Sample T-Test I test was used if the data met parametric assumptions, while if not met, the Mann-Whitney non-parametric test was used. The analysis of the effect of the treatment was calculated using the effect size (Nasution et al., 2021). This research method aims to analyze the effect and improve student learning outcomes by using the TGT type cooperative learning model assisted by Wordwall quantitatively, and identify the magnitude of the improvement calculated by N-Gain. This analysis aims to determine the effect and significant increase in student learning outcomes after the application of the wordwall-assisted TGT type cooperative learning model.

Results and Discussion

Data from the pretest results of students' learning outcomes abilities are presented in Table 1 below

Table 1 Data of pretest score

Descriptive Statistics						
	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Experiment Class Pretest	33	10	80	38.91	19.903	396.148
Control Class of Pretest	32	10	72	37.75	17.356	301.226

Table 2 Normality test of pretest data

Tests of Normality							
		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
Class		Statistic	Df	Sig.	Statistic	Df	Sig.
Pretest Score	Experiment Class	.093	33	.200*	.956	33	.201
	Control Class	.141	32	.105	.946	32	.107

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

From the table, it can be seen that if the Kolmogorov-Smirnov test Sig. value of both data is greater than 0.05, it can be concluded that both data are normally distributed.

Table 3 Homogeneous test results for pretest data

Test of Homogeneity of Variance						
		Levene				
		Statistic	df1	df2	Sig.	
Pretest Score	Based on Mean	.218	1	63	.642	
	Based on Median	.163	1	63	.687	
	Based on Median and with adjusted df	.163	1	57.307	.688	
	Based on trimmed mean	.210	1	63	.648	

From the table it is obtained that if the Sig. value is 0.642. Because $0.642 > 0.05$, the variance of the two populations is homogeneous so that it can be concluded if there is no difference in the variance of the experimental class pretest score with the control class.

Table 4 Two-sample independent t-test results Pretest data

Independent Samples Test									
Levene's Test for Equality of Variances				t-test for Equality of Means					
		F		Sig. (2-tailed)		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	T	df			Lower	Upper

Pretets Score	Equal variances assumed	.218	.642	.250	63	.803	1.159	4.638	-8.109	10.427
	Equal variances not assumed			.250	62	.803	1.159	4.628	-8.091	10.409

Decisions and conclusions are obtained if using Sig. If Sig. > 0.05 then H0 is accepted. If otherwise then H0 is rejected. From Table 4, it can be seen that Sig. (2tailed) = 0.803 which is greater than $\alpha = 0.05$, so the decision is also the same, namely H0 is accepted. So the conclusion is also the same, namely that there is no significant difference between the initial average ability of experimental and control class students. So that it can be continued with the final ability test.

Table 5 Final ability score data

Descriptive Statistics						
	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Experiment Class Posttest	33	70	100	82.85	9.938	98.758
Control Class Posttest	32	50	83	70.28	9.890	97.822

Based on the table, the average difference of 12.57 points shows that students who learn with the TGT model assisted by Wordwall obtain higher learning outcomes than students who learn with conventional methods.

Table 6 Normality test results of final ability score

Tests of Normality							
	Class	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	Df	Sig.
Post-test Score	Eksperimen Class	.146	33	.071	.922	33	.020
	Kontrol Class	.152	32	.058	.916	32	.017

a. Lilliefors Significance Correction

From Table 6 based on the results of the Sig. value of the two data <0.05, it can be concluded that the two data are not normal. As a result of the data not being normally distributed, it is not fulfilled in the normality test and the data cannot be tested with the Two Free Samples t-test, so what can be used to test the data from the two free samples of post-test data is the nonparametric statistics test with the Mann-Whitney test.

Table 7 Mann-whitney test results of final ability test data

Test Statistics ^a	
	Post-test Score
Mann-Whitney U	221.000
Wilcoxon W	749.000
Z	-4.038
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: Kelas

In Table 7, the Sig (2-tailed) value in the Mann-Whitney test is 0.000.. Calculation using z test statistic. Find $-Z_{tabel}$ and $-Z_{hitung}$ as follows, $-Z_{tabel} = -Z_{(1-\frac{\alpha}{2})}$ obtained $-Z_{tabel} = 1,96$. From Table 7 it can be obtained that $Z_{hitung} = -4,038$ Because $-Z_{tabel}$ is $-4,038 \leq -1,96$ the decision is H_0 rejected. Jika looking at Asymp.Sig. (2-tailed) of 0,000 which is smaller than $\alpha = 0,05$, the decision obtained is also H_0 rejected. This means that there is a significant average difference related to student learning outcomes between the class given the TGT (Team Games Tournament) Cooperative Learning Model treatment assisted by Wordwall and the class given the fixed treatment (conventional learning model). So it can be concluded that there is a significant effect related to student learning outcomes between the class given the TGT (Team Games Tournament) Cooperative Learning Model treatment assisted by Wordwall and the class given the fixed treatment (conventional learning model).

To analyze how much influence the TGT (Team Games Tournament) Cooperative Learning Model assisted by Wordwall on improving the mathematics learning outcomes of 8th grade students of SMPN 5 Tuban, the calculation of the treatment effect (effect size) is carried out with the following formula (because the data is not normally distributed):

In table 4.9 the price of $Z = -5.013$, $N = 33+32 = 65$

$$r = \frac{Z}{\sqrt{N}}$$

$$r = \frac{-5,013}{\sqrt{65}}$$

$$r = -0,6218$$

$$\begin{aligned} \text{Percentage of influence} &= r^2 \times 100\% \\ &= (-0,6218)^2 \times 100\% \\ &= 0,38663524 \times 100\% \\ &= 0,39 \times 100\% \\ &= 0,39\% \end{aligned}$$

Based on the results of the calculation of r , it can be interpreted according to the effect size benchmark, indicating that the treatment carried out by the researcher, namely the application of the TGT (Team Games Tournament) Cooperative Learning Model assisted by Wordwall to improve the learning outcomes of junior high school students with a percentage of influence of 39%, which according to the effect size benchmark is a large category

Table 8. Normality test of initial and final learning outcomes

	Tests of Normality					
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Pretest Results	.093	33	.200*	.956	33	.201
Posttest Results	.146	33	.071	.922	33	.020

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

From Table 4.8, the Kolmogorov-Smirnov test obtained a sig value. pre-test results (before treatment) of 0.200 and 0.201. While the post-test results (after being given treatment) obtained sig values. 0.071 and 0.020. Based on these results, the sig. value of the pre-test (before treatment) and post-test (after treatment) is less than 0.05. So it can be concluded that H_0 is rejected, which means that the data is not normally distributed. then the test used for two paired samples of initial and final ability data is the Wilcoxon nonparametric test.

Table 9. Wilcoxon test results of initial and final ability

		Ranks		
		N	Mean Rank	Sum of Ranks
Posttest Results - Pretest Results	Negative Ranks	0 ^a	.00	.00
	Positive Ranks	33 ^b	17.00	561.00
Ties		0 ^c		
Total		33		

- a. Posttest Results < Pretest Results
- b. Posttest Result > Pretest Results
- c. Posttest Results = Pretest Results

Test Statistics^a	
Posttest Results – Pretest Results	
Z	-5.013 ^b
Asymp. Sig. (2-tailed)	.000

- a. Wilcoxon Signed Ranks Test
- b. Based on negative ranks.

From table 9, it can be seen that $Z_{hitung} = -5,013$. Because $Z_{hitung} \leq -Z_{tabel}$ is $-5,013 \leq -1,96$ he decision is H_0 rejected. If you look at Asymp.Sig (2-tailed) which is 0.000 which is smaller than $\alpha = 0.05$ the decision obtained is also the same, namely H_0 is rejected. So the conclusion is that there is an increase in learning outcomes between classes treated with the TGT (Team Games Tournament) Cooperative Learning Model assisted by Wordwall in class VIII UPT SMP Negeri 5 Tuban before and after treatment.

To find out how much the improvement of learning outcomes in a study, N-Gain statistical analysis is used (Fauzi et al., 2022). The N-Gain test aims to measure the extent of the increase in value that occurs between the pretest and posttest after being given treatment or model.

The formula used to calculate the N-Gain score is as follows:

$$N - Gain = \frac{\text{mean posttest} - \text{mean pretest}}{100 - \text{mean pretest}}$$

$$N - Gain = \frac{82,84848 - 38,90909}{100 - 38,90909}$$

$$N - Gain = \frac{43,93939}{61,09091}$$
$$N - Gain = 0,719246$$

Based on the results of the N-Gain calculation, it shows that the treatment carried out by researchers, namely the application of the TGT (Team Games Tournament) Cooperative Learning Model assisted by Wordwall to improve the learning outcomes of junior high school students with a percentage increase of 0.719246 which is a high category. From this description, a conclusion can be drawn that the TGT (Team Games Tournament) Cooperative Learning Model assisted by Wordwall has a high increase in the ability of junior high school students in Class VIII UPT SMP Negeri 5Tuban in the 2024/2025 academic year.

This finding is supported by the results of similar studies, such as by (Rita et al., 2025), which showed that the application of the TGT model assisted by Wordwall significantly improved learning outcomes and participation. The same thing was also found by (Wahyudi et al., 2024) and (Ni'mah et al., 2024), which concluded that this approach had a positive impact on motivation, concept understanding, and student learning completeness.

Based on the results of this study and supported by various previous studies, it can be concluded that the TGT learning model assisted by Wordwall is very influential in learning junior high school mathematics, especially because it is able to improve student learning outcomes from both cognitive and affective aspects.

Conclusions And Suggestions

Based on the results of the study, it can be concluded that the application of the TGT (Team Games Tournament) type cooperative learning model assisted by Wordwall media has a significant effect on the mathematics learning outcomes of students in class VIII UPT SMP Negeri 5 Tuban. This is evidenced by the difference in learning outcomes between the experimental and control classes and the increase in student learning outcomes in the experimental class with a high category. Thus, the research objective of knowing the effect of TGT learning model assisted by Wordwall on students' mathematics learning outcomes has been achieved.

It is suggested that teachers can use this model as an alternative learning strategy, not only in mathematics but also in other appropriate subjects. Further research is also recommended to be conducted in a wider context so that the effectiveness of this model can be proven more comprehensively.

Reference

- Aliatunisa, N. (2024). *Penggunaan Aplikasi Game Wordwall Pada Mata Pelajaran Akidah Materi Iman Kepada Para Malaikat*. 2(5), 220–230.
<https://doi.org/10.61132/jmpai.v2i5.528>
- Alima, Y. S. N., & Sulistyowati, P. (2024). *Penerapan Model Pembelajaran Kooperatif Tipe Team Games Tournament Dengan Menggunakan Media Wordwall Untuk Meningkatkan Hasil Belajar Matematika Kelas 3 SDN Ciptomulyo 2 Malang*
Pendahuluan Pembelajaran matematika sering dianggap sulit dan menakutkan

- pada*. 1(2), 738–749. <https://conference.unikama.ac.id/artikel/>
- Asjudirja, DH & Ulia, N. (2025). Pengaruh Model Team Games Tournament Berbantuan Aplikasi Wordwall Terhadap Hasil Belajar Matematika Materi Bilangan Desimal Siswa Kelas Vi Sd. *JP-SA*, 5(005), 84–93.
- Dewi, I., Siregar, H., Agustia, A., & Dewantara, K. H. (2024). *Implementasi Case Method Berbasis Pembelajaran Proyek Kolaboratif terhadap Kemampuan Kolaborasi Mahasiswa Pendidikan Matematika*. 09(September), 261–276.
- Dwita, R., & Zulfitria. (2024). Teknologi Pendidikan Dalam Kurikulum Merdeka Belajar: Membangun Masa Depan Pendidikan yang Inklusif dan Berdaya Saing. *Cendekia: Jurnal Pendidikan Dan Pengajaran*, 2(6), 26–34.
- Fauzi, A., Rahmatih, A. N., & Haryati, L. F. (2022). Analisis Efektivitas Model Pembelajaran Blended Learning Ditinjau Dari Hasil Belajar Geometri Mahasiswa Guru Sekolah Dasar. *COLLASE (Creative of Learning Students Elementary Education)*, 5(1), 43–52. <https://doi.org/10.22460/collase.v5i1.9962>
- Kamarullah, K. (2017). Pendidikan Matematika Di Sekolah Kita. *Al Khawarizmi: Jurnal Pendidikan Dan Pembelajaran Matematika*, 1(1), 21. <https://doi.org/10.22373/jppm.v1i1.1729>
- Khalil, Y. S. H., Zubair, M., & Mareta, M. (2024). *Pengembangan Potensi Peserta Didik Berbasis Nilai dalam Membentuk Generasi Unggul Melalui Multiple Intelligence*. 9.
- Kusnadi, E. & azzahra S. (2024). Penggunaan Media Pembelajaran Interaktif Berbasis Wordwall dalam Meningkatkan Motivasi Belajar Peserta Didik Pada Mata Pelajaran PPKn di MA Al Ikhlas Padakembang Tasikmalaya. *JDPP*, 12(2). <https://doi.org/10.24269/dpp.v12i2.9526>
- Mulyani F, & Haliza N. (2021). Analisis Perkembangan Ilmu Pengetahuan dan Teknologi (Iptek) Dalam Pendidikan. *Jurnal Pendidikan Dan Konseling (Jpdk)*, 3(1), 101–109. <https://doi.org/10.31004/jpdk.v3i1.1432>
- Nabillah, T., & Abadi, A. P. (2019). Faktor penyebab rendahnya hasil belajar siswa. *Prosiding Seminar Nasional Matematika Dan Pendidikan Matematika Sesiomadika 2019*, 659–663.
- Nasution, M., Swistoro, E., & Medriati, R. (2021). Pengaruh Model Pembelajaran Problem Solving Fisika Terhadap Pemahaman Konsep Dan Kemampuan Berpikir Kritis Siswa Pada Materi Gelombang Bunyi. *Jurnal Ilmu Dan Pembelajaran Fisika*, 1, 1–8.
- Nenohai, J. M. H., Garak, S. S., Ekowati, C. K., & Udil, P. A. (2021). Pelatihan dan Pendampingan Implementasi Aplikasi Wordwall dalam Pembelajaran Matematika Bagi Guru Kelas Rendah Sekolah Dasar Inpres Maulafa Kota Kupang. *Jurnal Nasional Pengabdian Masyarakat*, 2(2), 101–110. <https://doi.org/10.47747/jnpm.v2i2.574>
- Ni'mah, V. S., & Samsudin. (2024). Peningkatan hasil dan motivasi belajar materi eksponen kelas x dengan model pembelajaran kooperatif tipe tgt (. *Jurnal Ilmiah Pendidikan Dasar*, 09, 419–432.
- Nisa, M. A., & Susanto, R. (2022). Pengaruh Penggunaan Game Edukasi Berbasis Wordwall Dalam Pembelajaran Matematika Terhadap Motivasi Belajar. *JPGI (Jurnal Penelitian Guru Indonesia)*, 7(1), 140–147. <https://doi.org/10.29210/022035jpgi0005>

- Nopiyanti, H. R., Witjoro, A., & Primilestari, L. (2024). *Pengaruh Model Pembelajaran Problem Solving Fisika Terhadap Pemahaman Konsep Dan Kemampuan Berpikir Kritis Siswa Pada Materi Gelombang Bunyi*. 3(7). <https://doi.org/10.17977/um068.v3.i7.2023.3>
- Oktaviasari, H., Pratiwi, D. E., & Hastungkoro, H. N. A. (2024). Penerapan Media Wordwall Untuk Meningkatkan Hasil Belajar Siswa Materi Konsep Penjumlahan Matematika Pada Kelas 1 SDN Putat Jaya IV-380 Surabaya. *Journal of Science and Education Research*, 3(2), 30–36. <https://doi.org/10.62759/jser.v3i2.128>
- Prasetya, I. W. S., & Agustika, G. N. S. (2023). Model Pembelajaran Kooperatif Tipe TGT Berbantuan Wordwall: Solusi Meningkatkan Kompetensi Pengetahuan Matematika Siswa Sekolah Dasar. *Indonesian Journal of Instruction*, 4(3), 163–172.
- Purba, G., Azzahra, S., Hutagalung, R., & Nasution, F. (2024). Strategi Pengembangan Profesionalisme Guru Di Era Digital. *Jurnal Tarbiyah Bil Qalam*, 8, 88–95.
- Purnamasari, S., Rahmanita, F., Soffiatun, S., Kurniawan, W., & Afriliani, F. (2020). Bermain Bersama Pengetahuan Peserta Didik Melalui Media Pembelajaran Berbasis Game Online Word Wall. *Jurnal Pengabdian Kepada Masyarakat*, 3(1), 177–180.
- Ratno, S., Amelia, F. R., Siagian, A. N., Dongoran, I. K., Pandiangan, L. L., Nasution, R. K., & Br, R. P. (2024). *Analisis Problematika Proses Pembelajaran IPA Pada Siswa Kelas VI SDN 060912 Medan Denai*.
- Rita, Jamaluddin, & Novitasari, E. (2025). *Penerapan Model Pembelajaran Team Games Tournament (TGT) Berbasis Wordwall dalam Upaya Meningkatkan Partisipasi dan Hasil Belajar Siswa SMKN 3 Takalar*. 03, 549–562.
- Sari, C. M., Anwar, R. B., & Vahlia, I. (2025). The Effect Of Using The Geogebra Application-Assisted Discovery Learning Model On Learning Outcomes. *EMTEKA: Jurnal Pendidikan Matematika*, 6(2), 616-626. <https://doi.org/10.24127/emteka.v6i2.8715>
- Susanti, P. R., Susilowati, D., & Exacta, A. P. (2024). Pengaruh Model Pembelajaran Team Games Tournament (TGT) Berbantuan Media Wordwall Terhadap Hasil Belajar Matematika Pada Materi Matriks. *Proximal: Jurnal Penelitian Matematika Dan Pendidikan Matematika*, 7(2), 952–960. <https://doi.org/10.30605/proximal.v5i2.4307>
- Wahyudi, D., Kurnia Rahmawati, D., Mardiani Zain, I., & Jabir. (2024). Pengaruh Model Pembelajaran Times Games Tournament (Tgt) Berbantuan Media Pembelajaran Wordwall Terhadap Hasil Belajar Kognitif Siswa. *Jurnal Ilmiah Pendidikan Dasar*, 9(2), 3541–3556.
- Waruwu, M., Natijatul, S., Utami, P. R., & Yanti, E. (2025). *Metode Penelitian Kuantitatif: Konsep, Jenis, Tahapan dan Kelebihan*. 10, 917–932.