



The Influence of Mathematical Disposition and Mathematics Anxiety on Bilingual Students’s Mathematics Achievement

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A B S T R A K	A R T I C L E I N F O
<p><i>Disposisi matematis merupakan sikap positif siswa terhadap matematika yang tercermin melalui kepercayaan diri, ketekunan, dan rasa ingin tahu, sedangkan kecemasan matematika merupakan kondisi emosional berupa rasa takut dan khawatir ketika berhadapan dengan aktivitas matematika. Penelitian ini bertujuan mengetahui pengaruh disposisi matematis dan kecemasan matematika terhadap hasil belajar matematika siswa kelas X Bilingual di salah satu SMA Kota Bandung. Penelitian menggunakan pendekatan kuantitatif dengan metode survei dan analisis regresi linear berganda. Sampel penelitian berjumlah 72 siswa yang dipilih menggunakan teknik Cluster Random Sampling. Data disposisi matematis dan kecemasan matematika diperoleh melalui angket skala Likert, sedangkan hasil belajar diperoleh dari nilai kuis, UTS, dan UAS. Hasil penelitian menunjukkan bahwa disposisi matematis dan kecemasan matematika secara simultan berpengaruh signifikan terhadap hasil belajar matematika siswa ($F=7,138;p=0,00152$) dengan kontribusi sebesar 17,1% ($R^2=0,171$). Secara parsial, disposisi matematis berpengaruh positif dan signifikan terhadap hasil belajar matematika ($B=1,284; p=0,016$), sedangkan kecemasan matematika tidak berpengaruh signifikan terhadap hasil belajar matematika ($B=0,107;p=0,835$). Temuan ini menunjukkan pentingnya pengembangan disposisi matematis untuk mendukung keberhasilan belajar siswa.</i></p>	<p>Article History: Received: 2026-05-29 Revision: 2026-06-06 Accepted: 2026-06-13 Published: 2026-06-17</p> <p>Kata Kunci: Disposisi Matematis, Kecemasan Matematika, Hasil Belajar,</p>
<p>A B S T R A C T</p> <p><i>Mathematical disposition is a student's positive attitude towards mathematics reflected through self-confidence, perseverance, and curiosity, while mathematical anxiety is an emotional condition in the form of fear and worry when dealing with mathematical activities. This study aims to determine the effect of mathematical</i></p>	<p>Keywords:</p> <p><i>Mathematical Disposition, Mathematic Anxiety, Mathematics Learning Outcomes,</i></p>

disposition and mathematical anxiety on the mathematics learning outcomes of tenth-grade bilingual students at a high school in Bandung City. The study used a quantitative approach with a survey method and multiple linear regression analysis. The research sample consisted of 72 students selected using the Cluster Random Sampling technique. Data on mathematical disposition and mathematical anxiety were obtained through a Likert scale questionnaire, while learning outcomes were obtained from quizzes, mid-term exams, and final exams. The results showed that mathematical disposition and mathematics anxiety simultaneously had a significant effect on students' mathematics learning outcomes ($F = 7.138$; $p = 0.00152$) with a contribution of 17.1% ($R^2 = 0.171$). Partially, mathematical disposition has a positive and significant effect on mathematics learning outcomes ($B = 1.284$; $p = 0.016$), while mathematics anxiety has no significant effect on mathematics learning outcomes ($B = 0.107$; $p = 0.835$). These findings show the importance of developing mathematical dispositions to support student learning success.

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1. INTRODUCTION

Mathematics is a subject that plays a crucial role in life and education because it fosters logical, systematic, critical, and creative thinking. Mathematics learning is not solely focused on students' cognitive abilities but also encompasses affective aspects that support the learning process. One indicator of successful mathematics learning is student learning outcomes. Mathematics learning outcomes are the abilities students acquire through a learning process encompassing knowledge, attitudes, and skills. However, students' mathematics learning outcomes remain a concern in education, as not all students achieve optimal outcomes (Sa'diyah et al., 2019; Wibowo, 2018).

Previous research has shown that students' mathematics learning outcomes are still suboptimal. Some students still experience difficulties understanding mathematical concepts, solving problems, and applying them in problem-solving. This situation indicates that students' mathematics learning outcomes still require attention in the mathematics learning process. Therefore, a study is needed on factors suspected of being related to students' mathematics learning outcomes (Sa'diyah et al., 2019; Wibowo, 2018; Lee et al., 2025).

Mathematics learning outcomes are influenced by various internal and external factors. Internal factors can include basic abilities, learning motivation, mathematical disposition, and anxiety in mathematics learning, among others. Meanwhile, external factors can include the learning environment, learning strategies, and interactions between teachers and students. Among these factors, mathematical disposition and mathematics anxiety are interesting affective aspects to study because both are related to students' attitudes and emotional states in mathematics learning (Wibowo, 2018; Le & Duong, 2021; Lee et al., 2025; Hong, 2024).

Mathematical disposition can be understood as students' positive attitude towards mathematics, reflected in self-confidence, perseverance, curiosity, flexible thinking, and appreciation for the role of mathematics in everyday life (Putra, Budiyo, & Slamet, 2017; Rahman, 2017). Mathematical disposition is also part of the affective domain in mathematics learning which plays a role in shaping students' attitudes and tendencies when facing mathematical problems (Izzati & Aulia, 2026). According to the National Council of Teachers of Mathematics (NCTM), mathematical disposition includes self-confidence in using mathematics, persistence in solving problems, interest and curiosity in mathematics, and the ability to reflect on mathematical thinking processes (Rahman, 2017; Putra et al., 2017). Mathematical disposition abilities are also considered important because they can influence how students think, behave, and act when faced with mathematical problems (Izzati & Aulia, 2026; Sofyan & Anastasyia, 2025). Students with strong mathematical dispositions tend to show more active attitudes toward mathematics learning, such as taking the initiative to solve problems, asking questions when encountering difficulties, and persisting in tackling mathematical problems. In addition, students with strong mathematical dispositions tend to show greater interest and drive in solving problems. mathematics (Sa'diyah et al., 2019; Kurniawan & Kadarisma, 2020).

On the other hand, learning mathematics often causes anxiety in students. Mathematics anxiety is an emotional state characterized by feelings of fear, tension, nervousness, and worry when students encounter mathematical activities, whether during study, assignments, or learning evaluations (Anugrah et al., 2019; Handayani, 2019; Verdeflor et al., 2025). Wibowo (2018) stated that many students still consider mathematics a difficult and frightening subject, resulting in negative responses to mathematics learning. This condition can affect students' comfort in participating in mathematics learning and affect their performance when solving mathematical problems (Anugrah et al., 2019; Pizzie & Kraemer, 2023; Handayani, 2019).

Based on various previous studies, mathematical disposition and mathematics anxiety are two affective aspects that are related to mathematics learning. Mathematical disposition is associated with students' positive attitudes towards mathematics, such as self-confidence, perseverance, and interest in solving mathematical problems, whereas mathematics anxiety is

associated with fear, tension, and worry when students face mathematical activities. Several studies show that students with good mathematical dispositions tend to be more active and confident in mathematics learning, while students with high levels of mathematics anxiety tend to experience concentration problems, difficulty in solving mathematical problems, and lower learning outcomes (Wibowo, 2018; Pizzie & Kraemer, 2023; Himmi & Azni, 2017; Lee et al., 2025). Therefore, these two affective aspects are suspected to be related to students' mathematics learning outcomes and warrant further study in mathematics learning.

Although various studies have addressed both mathematical disposition and math anxiety, previous research has generally examined these two variables by examining gender differences or linking them to specific mathematical abilities, such as numeracy, problem-solving, and understanding mathematical concepts. Furthermore, most studies have been conducted with regular students, leaving the characteristics of Bilingual students in mathematics learning largely unexplored.

Students in a bilingual system possess unique learning characteristics as a dual-language instruction triggers complex psychological responses that affect both cognitive and affective aspects. Consequently, conditions such as mathematical disposition and math anxiety are highly suspected to exert distinct influences on their mathematics learning outcomes. Simultaneously grasping mathematical concepts and foreign terminology can act as an internal factor that induces anxiety or hesitation during complex tasks. Conversely, when bilingual instruction is delivered through interactive modules, it can significantly mitigate these psychological hurdles, boost learning motivation, and ultimately exert a positive influence on their overall learning outcomes (Uma & Beku, 2024).

Research on the influence of mathematical disposition and mathematics anxiety on the mathematics learning outcomes of Bilingual students is still needed to provide an overview of the relationship between these three variables. Therefore, this study aims to determine the influence of mathematical disposition and mathematics anxiety together on the mathematics learning outcomes of tenth-grade bilingual students in one of the schools in Bandung City. The results of this study are expected to contribute to the study of affective factors in mathematics learning and to inform teachers' understanding of students' affective conditions during mathematics learning.

2. METHOD

Approach and Method

This research uses a quantitative approach with survey methods. A method that aims to obtain certain data to test hypotheses about the relationship between variables with various instruments (Sugiyono, 2019). The hypothesis tested is that mathematics disposition and anxiety influence student learning outcomes, with mathematics disposition and anxiety as independent variables and student learning outcomes as the dependent variable.

Subject, Location, and Time

The subjects in this research were tenth-grade bilingual students at one of Bandung's high schools. With a population of 106 tenth-grade bilingual students and a sample taken of 72 tenth-grade bilingual students. The research was conducted in May 2026.

The sampling technique used is Probability sampling with cluster random sampling, selecting certain areas (Sugiyono, 2019). This technique was chosen because the subjects studied were members of a specific class, namely the Bilingual class.

Types of Data, Instruments, and Collection Techniques

There are two data collection techniques carried out based on the source:

1. Primary data for the independent variables are disposition and mathematics anxiety
Data were collected through a survey questionnaire, consisting of a set of questions or written statements for students to answer (Sugiyono, 2019). The questionnaire was

prepared using a Likert scale with answers graded from very positive to very negative (Sugiyono, 2019). The instrument indicators used are shown in Tables 1 and 2.

Table 1. Mathematical Disposition Indicators

No	Indicator
1	Confidence in solving mathematical problems, communicating ideas, and providing mathematical reasons
2	Ability to think flexibly in exploring mathematical ideas and trying various alternative methods to solve problems
3	Perseverance in completing math assignments
4	Interest and curiosity in learning and discovering mathematical concepts
5	Ability to assess and understand the application of mathematics in various fields and everyday life

The Mathematical Disposition instrument indicator refers to NCTM (in Astriani & Al Dhana, 2023) which is then adapted according to needs.

Table 2. Indicators of Mathematics Anxiety

No	Indicator
1	Feelings of doubt and difficulty in understanding and doing mathematics
2	Tendency to avoid activities related to mathematics
3	Physical and emotional responses when faced with mathematics
4	Anxiety in mathematics evaluation situation
5	Anxiety about mathematics in everyday life

The indicator for the Mathematics Anxiety instrument refers to Mahmood (2011) in Sakinah (2021) which was then adapted according to needs.

2. Secondary Data for the dependent variable of student learning outcomes. Secondary data is information obtained indirectly from research subjects (Asari et al., 2023). Student learning outcome data were collected from the school's tenth-grade mathematics teacher, comprising accumulated quiz scores, midterm exams (UTS), and final exams (UAS) for mathematics in the odd semester.

Data analysis

Data analysis uses multiple linear regression with the help of the Python 3 programming language on the Google Colab platform, the aim is to test the influence of two or more independent variables on one dependent variable, as well as predict changes in the dependent variable if the independent variable experiences changes (Sugiyono, 2019). The analysis is carried out in several stages:

1. Instrument Quality Test

Before being used in research, the instrument is tested for validity and reliability.

a. Validity Test

Validity testing was carried out using Pearson Product Moment correlation. A statement item is declared valid if it has a sig value. (2-Tailed) less than 0.05 (Prastowo, 2021). Based on the test results, 15 statement items on the mathematical disposition instrument were declared valid, and one statement

item on the mathematics anxiety instrument was invalid (item K13), so this item was not included in the total score calculation.

b. Reliability Test

Reliability testing was conducted using Cronbach's alpha. an instrument is declared reliable if it has a Cronbach's Alpha value of more than 0.70 (Ghozali, 2018). The test results show that both instruments meet the reliable criteria.

2. Analysis Prerequisite Tes

After the research data is collected, prerequisite analysis is conducted to ensure that the regression model meets the required assumptions.

a. Residual Normality Test

In a residual normality test, the regression model is considered good if its residuals are normally distributed (Thankjaya et al., 2024). The normality test was carried out using the Kolmogorov–Smirnov Lilliefors method. The regression model is deemed to meet the normality assumption if the p-value is greater than 0.05 (Santoso, 2010).

b. Multicollinearity Test

The multicollinearity test is conducted by examining the Variance Inflation Factor (VIF) and tolerance (TOL) values. The regression model is considered free of multicollinearity if the VIF is less than 10 and the TOL is equal to 1 (Thankjaya et al., 2024).

c. Heteroscedasticity Test

The heteroscedasticity test was conducted to determine whether the regression model's error variance was not constant (Widarjono, 2007, in Selamatjaya et al., 2024). Heteroscedasticity can render hypothesis testing based on the t and F distributions unreliable (Thankjaya et al., 2024).

3. Multiple Linear Regression Analysis

The final stage is to test the multiple linear regression hypothesis. The test stages that need to be carried out are the simultaneous correlation test (R) to see the influence of the independent variables together on the dependent variable, the coefficient of determination (R^2) to see the percentage contribution of the influence, then a parameter test is carried out which aims to see whether or not there is an influence of the independent variable on the dependent variable with a simultaneous parameter test (F test), and a partial parameter test (t test) (Thankjaya et al., 2024).

3. RESULT AND DISCUSSION

RESULT

Descriptive statistics of research variables

Researchers distributed questionnaires to 72 tenth-grade bilingual students to evaluate their mathematical disposition and levels of mathematics anxiety. Table 1 presents the descriptive statistics for each construct.

Table 1. Descriptive Statistics of Research Variables

Variable	Minimum Score	Maximum Score	Mean Score	Standard Deviation
Mathematical Dispositions	32,00	59,00	43,93	5,66
Mathematics Anxiety	25,00	53,00	38,08	5,78
Learning Outcomes	31,44	95,25	62,07	18,67

Based on Table 1, it can be observed that mathematics learning outcomes show greater variation than mathematical disposition and mathematics anxiety. In contrast, both affective variables exhibit relatively homogeneous distributions.

Classical Assumption Test

To ensure the multiple linear regression analysis met the necessary statistical requirements, a classical assumption test was performed before conducting the analysis. The tests included residual normality, multicollinearity, and heteroscedasticity, with a summary of the test results presented in Table 2.

Table 2. Classical Assumption Test

Test Type	Indicator	Coefficient Value	Criteria Limit	Description
Residual Normality	Sig. KS-Lilliefors	0,291	> 0,05	Normally Distributed
Multicollinearity	VIF	2,090	< 10,00	No Multicollinearity
Heteroscedasticity	Sig. Breusch-Pagan	0,142	> 0,05	No Heteroscedasticity

Based on Table 2, the p-value for the residual normality test is 0.291 ($p > 0,05$), indicating that the model residuals are normally distributed. The VIF value of 2.090 (< 10) indicates that the regression model is free from multicollinearity. The Breusch–Pagan heteroscedasticity test yielded a significance value of 0.142 ($p > 0,05$), indicating that the model does not exhibit heteroscedasticity.

Multiple Linear Regression Analysis

After all assumptions were met, the analysis continued with multiple linear regression to determine the effect of mathematical disposition (X_1) and mathematics anxiety (X_2) on students' mathematics learning outcomes (Y). This analysis is carried out through several stages: model summary testing, simultaneous testing (F test), partial testing and the formation of regression equations.

1. Model Summary

Model summary testing was conducted to determine the extent of the relationships and contributions of mathematical disposition and math anxiety to the learning outcomes of tenth-grade bilingual students. The test results are presented in Table 3.

Table 3. Results of the Regression Model Summary Analysis

R	R Square	Adjusted R Square	Std. Error of the Estimate
0,414	0,171	0,147	17,236

Based on Table 3, the multiple correlation coefficient (R) of 0.414 indicates a moderate relationship between mathematical disposition and mathematics anxiety on student learning outcomes. The R-squared value of 0.171 indicates that mathematical disposition and mathematics anxiety contribute 17.1% to learning outcomes, while the remaining 82.9% is influenced by factors outside the study. The Adjusted R-squared value of 0.147 indicates that the model still explains 14.7% of the variance after accounting for the number of variables and the study sample. Meanwhile, the Std. The Error of the Estimate value of 17.236 indicates the regression model's prediction error.

2. Simultaneous Test (ANOVA/F Test)

A simultaneous test (*F test*) was conducted to determine whether mathematical disposition and math anxiety simultaneously have a significant effect on student learning outcomes. The test results are presented in Table 4.

Table 4. Results of Analysis of Variance (ANOVA/F Test)

Regression Model	F-count	Sig.
Regression	7,138	0,00152

Based on Table 4, the F-count value is 7.138 with a significance value (Sig.) of 0.00152 ($p < 0,05$). This means that mathematical disposition and math anxiety simultaneously have a significant effect on the learning outcomes of tenth-grade bilingual students.

3. Partial Test and Regression Equation

A partial test (*t-test*) was conducted to determine the effect of each independent variable on student learning outcomes. The test results are presented in Table 5.

Table 5. Results of Partial Test (t-test)

Variable	Coefficient (B)	t-count	Sig.	Description
(Constant)	1,599	0,098	0,922	-
Mathematical Disposition (X_1)	1,284	2,459	0,016	Significant
Mathematics Anxiety (X_2)	0,107	0,208	0,835	Not Significant

Based on the coefficient value (B) in Table 5, the following regression equation is obtained: $Y = 1,599 + 1,284X_1 + 0,107X_2$.

The constant of 1.599 indicates the initial value of learning outcomes when mathematical disposition and math anxiety are held constant. However, this constant is not statistically significant ($p > 0,05$).

The mathematical disposition variable has a positive regression coefficient of 1.284 with a t-value of 2.459 and a significance value of 0.016 ($p < 0,05$). These results indicate that mathematical disposition has a positive and partially significant effect on the mathematics learning outcomes of tenth-grade bilingual students. This means that each one-unit increase in mathematical disposition is predicted to increase learning outcomes by 1.284 units, assuming other variables remain constant.

Meanwhile, the mathematics anxiety variable has a regression coefficient of 0.107 with a t-value of 0.208 and a significance value of 0.835 ($p > 0,05$). These results indicate that mathematics anxiety does not have a partial significant effect on the mathematics learning outcomes of tenth-grade bilingual students. Thus, changes in students' mathematics anxiety levels do not have a significant effect on changes in mathematics learning outcomes independently.

DISCUSSION

The results of this study indicate that mathematical disposition and mathematics anxiety simultaneously have a significant effect on the mathematics learning outcomes of tenth-grade bilingual students. This finding suggests that affective aspects play a crucial role in supporting successful mathematics learning. A strong mathematical disposition can encourage students to be more confident, persistent, and active learners, while appropriate anxiety management helps them maintain focus during mathematics lessons. These findings align with research by Kurniawan and Kadarisma (2020) and Inayah et al. (2023), which showed that mathematical disposition is related to mathematical ability and student learning outcomes. Meanwhile,

research by Handayani (2019) and Efendi et al. (2025) also shows that mathematics anxiety is related to students' mathematics learning processes and outcomes. Furthermore, Palupi (2020), Sari et al. (2022), and Rachmani et al. (2024) explain that students' affective and psychological aspects also influence their learning engagement and achievement of mathematics learning outcomes.

Mathematical disposition partially has a positive and significant effect on mathematics learning outcomes among tenth-grade Bilingual students. These results indicate that a positive attitude toward mathematics is related to improved student learning outcomes. This finding aligns with research by Kurniawan and Kadarisma (2020) and Inayah et al. (2023), which states that mathematical disposition positively contributes to students' mathematical problem-solving and communication skills. In the context of tenth-grade Bilingual students, mathematical disposition becomes even more important because students are in a learning environment with different academic demands than those in regular classes. These conditions require strong academic adaptability skills to ensure students can optimally participate in the learning process. These findings are supported by research by Hidayat and Rosyana (2022), Putri and Rahmawati (2023), and Wulandari et al. (2024), which shows that academic adaptability and active student engagement contribute to learning success in more complex learning environments.

Unlike mathematical disposition, math anxiety in this study did not significantly influence the learning outcomes of tenth-grade bilingual students. These results indicate that differences in student anxiety levels are not directly related to differences in mathematics learning outcomes. This finding contrasts with Handayani (2019), who stated that math anxiety tends to negatively impact students' ability to understand concepts and solve mathematical problems. However, this study aligns with Efendi et al. (2025), who found that math anxiety does not always have a significant partial impact on student learning outcomes.

Based on interviews with subject teachers, the difference between tenth-grade bilingual and regular classes lies in the addition of English-language curriculum components, while the mathematics material taught is relatively the same. This situation suggests that tenth-grade bilingual students are accustomed to facing more diverse learning demands and therefore demonstrate stronger academic adaptability (Suryadi et al., 2020). One factor that may explain this finding is academic resilience, namely the ability of students to persist and adapt when facing various challenges in the learning process (Kumalasari & Akmal, 2020). This ability enables students to maintain their academic performance despite experiencing stress or anxiety in mathematics learning.

Furthermore, self-regulated learning is also thought to play a role in mitigating the impact of anxiety on learning outcomes. Self-regulated learning is a student's ability to independently regulate, monitor, and evaluate their learning process (Abror, 2024). Students with good self-regulation tend to manage their emotions, choose appropriate learning strategies, and maintain focus when facing learning difficulties. Findings by Trisniawati et al. (2023) indicate that self-regulation contributes to student learning success. Therefore, the math anxiety experienced by tenth-grade bilingual students may not directly affect their learning outcomes because academic resilience and self-regulation help them cope effectively with learning demands and remain successful in the learning process.

CONCLUSION

Based on the results of the data analysis and discussion, this research concludes that mathematical disposition and mathematics anxiety, together (simultaneously), have a significant influence on the mathematics learning outcomes of tenth-grade bilingual students, with a contribution of 17.1%. However, partially these two affective variables show different impacts. Mathematical disposition has been shown to have a positive, significant effect on student learning outcomes. This indicates that strengthening affective aspects, such as self-confidence, perseverance, and appreciation of the role of mathematics, contributes significantly

to increasing students' academic achievement. In contrast, partial mathematics anxiety did not significantly influence the mathematics learning outcomes of tenth-grade bilingual students. Emotional states of anxiety or tension when faced with mathematical activities were found not to significantly influence their learning performance, suggesting that Bilingual class students have better academic adaptability in managing complex learning pressures.

Based on these findings, it is recommended that mathematics teachers not only focus on cognitive aspects but also actively design learning strategies that foster students' mathematical dispositions, such as motivation, resilience, and self-confidence in solving mathematical problems. For future researchers, it is recommended to expand the area of coverage and the number of research samples to strengthen the generalizability of the results. Apart from that, it is also recommended to include additional affective or psychological variables, as well as to conduct a direct comparative study of the characteristics of students in Bilingual and regular classes, to obtain a more comprehensive picture.

REFERENCES

- Abror, M. H. (2022). Self-regulated Learning Terhadap Hasil Belajar Matematika Siswa. *Plusminus: Jurnal Pendidikan Matematika*, 2(2), 233-242.
- Anugrah, T. M., Kusmayadi, T. A., & Fitriana, L. (2019). Mathematics anxiety in dealing math exams. *Journal of Physics: Conference Series*, 1157(3), 032101.
- Asari, A., Zulkarnaini, Hartatik, Anam, A. C., Suparto, Litamahuputty, J. V., Dewadi, F. M., Prihastuty, D. R., Maswar, Syukrilla, W. A., Murni, N. S., & Sukwika, T. (2023). *Pengantar Statistika*. PT Mafy Media Literasi Indonesia
- Astriani, N., & Al Dhana, M. B. (2025). Disposisi matematis siswa dengan menggunakan pembelajaran berbasis masalah. *OMEGA: Jurnal Keilmuan Pendidikan Matematika*, 4(2), 44-49.
- Efendi, R., Diana, Y., & Panjaitan, A. (2025). Analisis disposisi matematis, kecemasan matematika, dan numerasi siswa di daerah 3T. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 9(2), 3967-3980.
- Ghozali, I. (2018). *Aplikasi analisis multivariate dengan program IBM SPSS 25 (Edisi 9)*. Badan Penerbit Universitas Diponegoro.
- Handayani, S. D. (2019). Pengaruh kecemasan matematika terhadap pemahaman konsep matematika. *SAP (Susunan Artikel Pendidikan)*, 4(1), 59-65.
- Hidayat, T., & Rosyana, T. (2022). Kemampuan adaptasi akademis dan efikasi diri siswa dalam kelas matematika berbasis Bilingual. *Jurnal Pembelajaran Matematika*, 10(2), 143-154.
- Himmi, N., & Azni, A. (2017). Hubungan kesiapan belajar dan kecemasan matematika terhadap hasil belajar matematika siswa SMP. *PYTHAGORAS*, 6(1), 22-30.
- Hong, J. (2024). Design and evaluation of a mixed reality-based education model: Impacts on learning outcomes. *ACM International Conference Proceeding Series*.
- Inayah, R., Andinny, Y., & Pujiati, A. (2025). Pengaruh disposisi matematis terhadap kemampuan komunikasi matematis. *Prosiding Diskusi Panel Nasional Pendidikan Matematika*, 589-596.
- Izzati, N., & Aulia, R. Analisis kemampuan disposisi matematis siswa SMP ditinjau dari *self-regulated learning* dalam studi kualitatif. *Jurnal Pembelajaran Matematika Inovatif*, 9(1), 30721
- Kermek, D., & Kaniški, M. (2020). Analysis of learning outcomes in gamified blended e-learning course. *International Journal of Emerging Technologies in Learning (iJET)*.
- Kumalasari, D., & Akmal, S. Z. (2020). Resiliensi akademik dan kepuasan belajar daring di masa pandemi COVID-19: Peran mediasi kesiapan belajar daring. *Persona: Jurnal Psikologi Indonesia*, 9(2), 353-368.

- Kurniawan, A., & Kadarisma, G. (2020). Pengaruh disposisi matematis terhadap kemampuan pemecahan masalah matematis siswa SMP. *JPMI (Jurnal Pembelajaran Matematika Inovatif)*, 3(2), 99-108.
- Le, T. P., & Duong, M. Q. (2021). The assessment of student learning outcomes in accordance with CDIO model at the Vietnam National University Ho Chi Minh City. *European Journal of Contemporary Education*, 10(3), 653–663.
- Lee, M., & Collins, K. (2025). Examining the relationship between math anxiety, effort, and learning outcomes using latent class analysis. *Proceedings of the International Conference on Learning Analytics & Knowledge (LAK 2025)*, 226–236.
- Palupi, R. (2020). Pengaruh disposisi matematis terhadap hasil belajar matematika siswa. *Kontinu: Jurnal Penelitian Didaktik Matematika*, 4(2), 89-101.
- Pizzie, R. G., & Kraemer, D. J. M. (2023). Strategies for remediating the impact of math anxiety on high school math performance. *npj Science of Learning*, 8(1), 44.
- Prastowo, S. L. (2021). *Metode Penelitian Kuantitatif Dilengkapi Dengan Teknik Pengolahan Data Program SPSS*. PT Jamus Baladewa Nusantara.
- Putra, A. K., Budiyo, & Slamet, I. (2017). Mathematical disposition of junior high school students viewed from learning styles. *AIP Conference Proceedings*, 1868(1), 050025.
- Putri, A. E., & Rahmawati, S. (2023). Regulasi emosi dan strategi koping siswa program internasional/Bilingual dalam menghadapi tekanan pelajaran eksakta. *Jurnal Psikologi Pendidikan*, 11(1), 76-89.
- Rachmani, A. S., Gani, A., & Nindiasari, H. (2024). Analisis hubungan disposisi matematis dengan kemampuan berpikir kritis siswa sekolah menengah. *JPMI (Jurnal Pembelajaran Matematika Inovatif)*, 7(1), 45-56.
- Rahman, T. (2017). Meningkatkan disposisi matematis siswa dengan menggunakan pembelajaran berbasis penemuan terbimbing. *PYTHAGORAS*, 6(1), 61–66.
- Sa'diyah, M., Sa'dijah, C., Sisworo, & Handayani, U. F. (2019). How students build their mathematical dispositions towards solving contextual and abstract mathematics problems. *Journal of Physics: Conference Series*, 1397(1), 012090.
- Sakinah, D. A. (2021). Pengaruh kecemasan matematika terhadap kemandirian belajar dan kemampuan pemahaman konsep matematika di masa pandemi (Skripsi, Universitas Muhammadiyah Gresik).
- Santoso, S. (2010). *Statistik Nonparametrik*. Elex Media Komputindo.
- Sari, W. P., Rifai, R., & Yaniawati, R. P. (2022). Analisis kecemasan matematika dan kemandirian belajar siswa dalam pembelajaran daring. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 6(1), 812-825.
- Sofyan, A., & Anastasyia, N. (2025). Pengaruh kebiasaan berpikir, resiliensi, dan disposisi matematis terhadap hasil belajar matematika siswa kelas VIII di Kecamatan Teluk Ambon. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 9(2), 857–870.
- Sugiyono. (2019). *Metode Penelitian Pendidikan (Kuantitatif, Kualitatif, Kombinasi, R&D dan penelitian Pendidikan)* (3rd ed.). ALFABETA.
- Suryadi, Triyono, Nur, A., & Dianto, M. (2020). Hubungan penyesuaian diri dan motivasi belajar dengan prestasi belajar siswa. *Jurnal Neo Konseling*, 2(1), 1-9.
- Terimajaya, W., Dewi, N. L. S., Simamora, T., Judijanto, L., Sigamura, R. K., Nuryati, Kusumastuti, S. Y., Bahana, R., Laka, L., Permatasari, A. H., Salma, A., Sudarsani, N. P., Ardiansyah, & Basri. (2024). *Dasar-Dasar Statistika : Konsep dan Metode Analisis*. PT. Sonpedia Publishing Indonesia.
- Trisniawati, Rhosyida, N., Muanifah, M. T., Megawati, I., Widodo, S. A., Nisa, A. F., Suwandayani, B. I., & Ardiyaningrum, M. (2023). Exploration of self-regulated learning through Edmodo. *Jurnal Prima Edukasia*, 11(1), 38-46.
- Uma, L. M. W., Beku, V. Y., & Noge, M. D. (2024). Analisis penerapan pembelajaran bilingual siswa kelas IV di SDI Rutosoro. *Jurnal Terapi Wicara dan Bahasa*, 2(2), 917–936.

- Verdeflor, R. N., Gayrama, V. P., Cabalbag, J. R., Sabonsolin, R. T., Panit, N. M., Aquino, W. G., & Sintos, J. R. (2025). Fear of numbers: How learners overcome mathematics anxiety through positive teaching practices and instructional intervention. *Environment and Social Psychology*, 10(5).
- Wibowo, E. (2018). Hubungan antara kecemasan belajar matematika dengan disposisi matematis siswa di SMP Negeri 2 Luwuk. *PYTHAGORAS*, 7(1), 47–54.
- Wulandari, S., Utami, P., & Nugroho, A. (2024). Peran anxiety fungsional (facilitative anxiety) terhadap fokus kognitif siswa dalam memecahkan masalah trigonometri. *Jurnal Riset Pendidikan Matematika*, 11(1), 32-45.