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THE EFFECT OF MATHEMATICS ANXIETY ON STUDENT LEARNING OUTCOMES IN GRADE X OF SMAN 1 DARUL IMARAH ACEH BESAR

PENGARUH KECEMASAN MATEMATIKA TERHADAP HASIL BELAJAR SISWA DI KELAS X SMAN 1 DARUL IMARAH ACEH BESAR

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Abstract

The purpose of this study was to determine the effect of mathematics anxiety on the learning outcomes of class X students of SMAN 1 Darul Imarah Aceh Besar. This study is a quantitative research type with a correlational approach. The sources and methods of data collection in this study were obtained through the distribution of mathematics anxiety questionnaires, documentation of mathematics learning outcomes, and interviews as supporting data. The questionnaire used was a Likert scale with 23 statement items that measured the level of students' mathematics anxiety. Respondents in this study were 71 class X students of SMAN 1 Darul Imarah Aceh Besar in the 2025/2026 academic year who were selected using the Proportional Random Sampling technique. Data were analyzed using descriptive statistics, normality tests, linearity tests, and simple linear regression analysis with the help of the SPSS version 20 program. The results showed that the level of students' mathematics anxiety was in the moderate category with an average value of 65.82, while the mathematics learning outcomes were in the sufficient category with an average value of 73.38. The results of the regression analysis indicate that mathematics anxiety has a negative and significant effect on students' mathematics learning outcomes with a regression equation of $Y = 5.899 - 1.120X$ and a significance value of $0.000 < 0.05$. The coefficient of determination (R^2) of 0.558 indicates that mathematics anxiety contributes 55.8% to the variation in students' mathematics learning outcomes, while the remaining 44.2% is influenced by other factors outside this study. The conclusion of this study is that mathematics anxiety has a negative and significant effect on the mathematics learning outcomes of class X students of SMAN 1 Darul Imarah Aceh Besar. This means that the higher the mathematics anxiety experienced by students, the lower the mathematics learning outcomes obtained. Conversely, the lower the mathematics anxiety, the better the students' learning outcomes.

Keywords : Influence, Negative, Mathematics Anxiety, Learning Outcomes.

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Abstrak

Tujuan dari penelitian ini adalah untuk mengetahui pengaruh kecemasan matematika terhadap hasil belajar siswa kelas X SMAN 1 Darul Imarah Aceh Besar. Penelitian ini merupakan jenis penelitian kuantitatif dengan pendekatan korelasional. Sumber dan metode pengumpulan data dalam penelitian ini diperoleh melalui penyebaran angket/kuesioner kecemasan matematika, dokumentasi nilai hasil belajar matematika, dan wawancara sebagai data pendukung. Angket yang digunakan berbentuk skala Likert dengan 23 butir pernyataan yang mengukur tingkat kecemasan matematika siswa. Responden dalam penelitian ini adalah 71 siswa kelas X SMAN 1 Darul Imarah Aceh Besar Tahun Ajaran 2025/2026 yang dipilih menggunakan teknik *Proportional Random Sampling*. Data dianalisis menggunakan statistik deskriptif, uji normalitas, uji linearitas, dan analisis regresi linear sederhana dengan bantuan program SPSS versi 20. Hasil penelitian menunjukkan bahwa tingkat kecemasan matematika siswa berada pada kategori sedang dengan nilai rata-rata sebesar 65,82, sedangkan hasil belajar matematika berada pada kategori cukup dengan nilai rata-rata sebesar 73,38. Hasil analisis regresi menunjukkan bahwa kecemasan matematika berpengaruh negatif dan signifikan terhadap hasil belajar matematika siswa dengan persamaan regresi $Y = 5{,}899 - 1{,}120X$ dan nilai signifikansi sebesar $0{,}000 < 0{,}05$. Nilai koefisien determinasi (R^2) sebesar 0,558 menunjukkan bahwa kecemasan matematika memberikan kontribusi sebesar 55,8% terhadap variasi hasil belajar matematika siswa, sedangkan 44,2% sisanya dipengaruhi oleh faktor lain di luar penelitian ini. Simpulan penelitian ini adalah kecemasan matematika berpengaruh negatif dan signifikan terhadap hasil belajar matematika siswa kelas X SMAN 1 Darul Imarah Aceh Besar. Artinya, semakin tinggi kecemasan matematika yang dialami siswa, semakin rendah hasil belajar matematika yang diperoleh. Sebaliknya, semakin rendah kecemasan matematika, semakin baik hasil belajar siswa.

Kata Kunci : Pengaruh, Negatif, Kecemasan Matematika, Hasil Belajar.

1. INTRODUCTION

Mathematics is a basic subject that plays a crucial role in developing students' logical, critical, analytical, and systematic thinking skills. Learning mathematics is not only about mastering concepts, but also about the ability to solve problems and make rational decisions in everyday life. This aligns with Suherman (2020), who stated that mathematics is a tool for scientific thinking that helps individuals understand and control their environment logically and rationally. The importance of mathematics is also emphasized in Minister of Education and Culture Regulation Number 21 of 2016 concerning Elementary and Secondary Education Content Standards, as a compulsory subject for developing students' numeracy competencies. However, in practice, mathematics is still often perceived as difficult and intimidating by students (Susanto, 2022).

Difficulty understanding abstract mathematical concepts can lead to feelings of fear, nervousness, and anxiety, known as math anxiety. Math anxiety is a feeling of tension, fear, or apprehension when faced with tasks involving numbers, symbols, and mathematical calculations (Ahmmed et al., 2024). This condition can hinder students' ability to process information and solve problems because some of their cognitive energy is consumed by anxiety (Ashcraft & Krause, 2022). Math anxiety can also arise from negative experiences, such as failing an exam, a stressful teaching style, or a competitive learning environment (Marweli & Meiliasari, 2024).

Math anxiety impacts students' learning processes and outcomes. Students with high levels of anxiety tend to avoid lessons, procrastinate, lack self-confidence, have difficulty concentrating, and give up easily when faced with math problems (Hidayat & Rahmawati, 2022; Nuraeni & Munandar, 2023). Rahman (2021) also found that students with high levels of math anxiety tend to achieve lower math grades than students with low levels of anxiety. In this regard, learning outcomes are an indicator of learning success, encompassing changes in students' knowledge, skills, and attitudes. According to

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Sudjana (2021), learning outcomes are influenced by internal factors, such as interest, motivation, and anxiety, as well as external factors, such as learning methods and the learning environment.

This problem was also identified through initial observations at SMAN 1 Darul Imarah, Aceh Besar. Most tenth-grade students exhibited fear and nervousness during mathematics lessons, particularly when faced with problems requiring analysis. Teachers also reported that some students lacked self-confidence and gave up easily when they encountered difficulties understanding the material. Furthermore, the average math exam score for the odd semester of the 2024/2025 academic year was still below the Minimum Completion Criteria (KKM), which was 68. Some students even reported experiencing anxiety symptoms such as fear of making mistakes, sweating, and heart palpitations when working on problems in front of the class. These conditions indicate that math anxiety has the potential to be a factor influencing student learning outcomes.

Based on these conditions, research on math anxiety is important to determine its impact on student learning outcomes. Therefore, this study aims to determine whether math anxiety influences the learning outcomes of tenth-grade students at SMAN 1 Darul Imarah, Aceh Besar. Theoretically, this research is expected to enrich educational studies, particularly regarding non-cognitive factors that influence mathematics learning outcomes, and serve as a reference for further research. Practically, the research results are expected to be a consideration for teachers and schools in creating more enjoyable learning and supporting students in managing math anxiety, as well as helping students increase their self-confidence and learning effectiveness.

2. RESEARCH METHOD

This study used a quantitative method with a correlational research approach and a simple correlation design to determine the relationship and influence of mathematics anxiety (X) on student learning outcomes (Y). The study was conducted at SMAN 1 Darul Imarah Aceh Besar in the even semester of the 2025/2026 academic year, May–June 2026. The study population was all 244 tenth-grade students of SMAN 1 Darul Imarah Aceh Besar in the 2025/2026 academic year. The sample was determined using the Slovin formula with a 10% error rate, resulting in a sample size of 71 students. Proportional random sampling was used, considering the proportion of students in each class.

Data collection was conducted through a mathematics anxiety questionnaire, documentation of learning outcomes, and interviews as supporting data. The mathematics anxiety questionnaire was a closed-ended questionnaire with a five-level Likert scale and consisted of 23 statements adapted from research by Rahmita Prasukam Dewi (2023) based on the Mathematics Anxiety Rating Scale (MARS) by Richardson and Suinn. The statements covered anxiety regarding assignments and exams, the learning process, mathematical symbols and numbers, and personal abilities in understanding mathematics. Learning outcome data were obtained from Final Semester Mathematics Exam (UAS) scores documented by the school. Semi-structured interviews were conducted with three students purposively selected based on their attitudes toward mathematics—those who liked, were neutral, and those who disliked mathematics—to serve as supporting data and for triangulation.

The mathematics anxiety instrument underwent validity and reliability testing in Dewi's (2023) research. All 23 statements were declared valid because they had a significance value <0.05, while the reliability test yielded a Cronbach's Alpha value of 0.929 (>0.70), thus declaring the instrument to have very high reliability and was suitable for use.

Data analysis was conducted using SPSS version 26 through descriptive statistics to describe mathematics anxiety and learning outcomes based on mean, minimum, maximum, and standard deviation values. Furthermore, normality and linearity tests were performed as prerequisites for analysis. Hypothesis testing used simple linear regression to determine the effect of mathematics anxiety on learning outcomes. Hypothesis decisions were based on a significance value of 0.05, while the coefficient of determination (R^2) was used to determine the magnitude of mathematics anxiety's contribution in explaining variations in student learning outcomes.

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3. RESULT AND DISCUSSION

Based on the results of a study of 71 tenth-grade students at SMAN 1 Darul Imarah Aceh Besar, students' math anxiety levels were in the moderate category. The average math anxiety score was 65.82, with a minimum score of 38, a maximum score of 90, and a standard deviation of 12.70. Of the 71 students, 51 (71.8%) were in the moderate category, 18 (25.4%) were in the low category, and 2 (2.8%) were in the very low category. No students were in the high or very high anxiety category. These results indicate that most students still experience fear, nervousness, worry, or a lack of confidence when faced with mathematics learning and assignments, but their anxiety levels have not yet reached the very high category.

Interviews revealed that students' math anxiety has different forms and causes. Students who enjoy math can still experience nervousness, especially when facing exams or questions they find difficult, but they tend to be able to manage their anxiety through study preparation. Students with a neutral attitude toward math are more likely to feel anxious when faced with material or questions they don't yet understand. Meanwhile, students who dislike mathematics tend to experience fear from the beginning of the lesson due to the perception that mathematics is a difficult subject. These findings indicate that perceptions of mathematics, previous learning experiences, level of understanding of the material, and self-confidence are all factors related to the emergence of mathematics anxiety. Therefore, learning that provides a sense of security, good communication, and avoids excessive pressure is necessary to help students better manage their anxiety.

Regarding learning outcomes, students' Final Semester Exam (UAS) math scores averaged 73.38, with a minimum score of 60, a maximum score of 92, and a standard deviation of 7.46. Based on the learning outcome categorization, 36 students (50.7%) were in the fair category, 21 students (29.6%) were in the poor category, 11 students (15.5%) were in the good category, 2 students (2.8%) were in the very good category, and 1 student (1.4%) was in the very poor category. Thus, the overall mathematics learning outcomes of tenth-grade students at SMAN 1 Darul Imarah Aceh Besar are in the fair category. Although some students achieved good learning outcomes, some still received low scores, indicating that their mathematics learning achievement was not yet optimal. This condition aligns with Sudjana's (2021) opinion that learning outcomes are abilities acquired by students after participating in the learning process, and their achievement can be influenced by various factors, including intellectual and psychological factors, motivation, the learning environment, and learning strategies.

Before conducting the regression analysis, the study first conducted a prerequisite test to determine the feasibility of the relationship between mathematics anxiety and learning outcomes. The results of the linearity test showed a significance value of 0.000 (<0.05), while the Deviation from Linearity value was 0.474 (>0.05). These results indicate a linear relationship between mathematics anxiety and learning outcomes, with no significant deviations from the linear relationship. With the linearity test met, the analysis could proceed using simple linear regression.

The results of the simple linear regression analysis yielded the equation Y = 5.899 - 1.120X. The regression coefficient of -1.120 indicates a negative relationship, which means that every one unit increase in mathematics anxiety is followed by a decrease in learning outcomes of 1,120 units. Conversely, the lower a student's math anxiety, the higher their learning outcomes tend to be. A significance value of 0.000 (<0.05) indicates that math anxiety significantly influences the mathematics learning outcomes of tenth-grade students at SMAN 1 Darul Imarah Aceh Besar.

The t-test results further strengthen this finding. The calculated t-value is -9.333 with a significance value of 0.000 (<0.05), thus H_0 is rejected and H_a is accepted. This means there is a negative and significant influence of math anxiety on student learning outcomes. The correlation coefficient (R) of 0.747 indicates a strong relationship between math anxiety and learning outcomes. Meanwhile, the R-square value of 0.558 indicates that math anxiety contributes 55.8% to the variation in students' math learning outcomes. The remaining 44.2% is influenced by other factors not examined

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in this study, such as motivation and interest in learning, initial ability, intelligence, learning strategies, parental support, the learning environment, teacher teaching methods, and other psychological factors.

The research findings show that math anxiety is a significant factor in student learning outcomes. High levels of anxiety can cause students to have difficulty concentrating, lack conceptual understanding, lose confidence, and experience obstacles when solving math problems. When students perceive mathematics as a difficult subject, fear and worry can arise before and during the learning process. This can reduce students' readiness to absorb the material and complete assigned tasks. Conversely, students with lower levels of anxiety tend to be calmer and have a better chance of concentrating and understanding the material.

The results of this study also demonstrate the importance of teachers' role in reducing math anxiety. Teachers need to create a comfortable, communicative learning environment and avoid putting excessive pressure on students. Providing opportunities for students to ask questions, explaining step-by-step solutions, providing reinforcement for student efforts, and building self-confidence can help reduce math anxiety. Thus, managing anxiety is not only an effort to increase student comfort during learning but also a crucial part of improving math learning outcomes. Based on the overall analysis, it can be concluded that the higher the math anxiety experienced by students, the lower the learning outcomes, while the lower the math anxiety, the better the learning outcomes tend to be.

4. CONCLUSION

Based on the research results, the following conclusions can be drawn:

1. Students' math anxiety levels are in the moderate category with an average score of 65.82, indicating that most students still experience anxiety when learning mathematics, but not yet at a very high level.
2. Students' math learning outcomes are in the adequate category with an average score of 73.38, indicating that students have generally achieved the expected basic competencies, although some students still have low learning outcomes.
3. The results indicate that math anxiety has a negative and significant effect on students' math learning outcomes. This is indicated by the regression equation $Y = 5.899 - 1.120X$ with a significance value of $0.000 < 0.05$, thus accepting the alternative hypothesis (H_a). The negative regression coefficient indicates that the higher the level of math anxiety experienced by students, the lower their math learning outcomes. Conversely, the lower the level of math anxiety, the better the students' learning outcomes. In addition, the results of the coefficient of determination show an R^2 value of 0.558, which means that mathematics anxiety contributes 55.8% to the variation in students' mathematics learning outcomes, while the remaining 44.2% is influenced by other factors not examined in this study, such as learning motivation, initial abilities, learning strategies, family support, and learning environment.

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