

Students' Attitude and Its Relationship with Academic Achievement in Mathematics: A Literature Review

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Abstract: *This study analyses the students' attitude and its relationship with academic achievement in Mathematics through a comprehensive literature review. Several key constructs namely self-confidence, value, enjoyment, self-perception, motivation and anxiety are analyzed. The findings of the study revealed that there is a significant positive relationship between students' attitude and academic achievement in Mathematics. This study suggests a comprehensive approach that involves improving the quality of teaching, providing adequate academic support, and improving the learning environment. The results of this study are expected to provide guidance to improve student performance in Mathematics.*

Keywords: Mathematics, Students attitude, Academic achievement

1. Introduction

Mathematics is a crucial subject that fosters logical thinking and problem-solving skills, yet it is often perceived negatively by students. Students' attitude towards mathematics and achievement has been widely discussed in relation to mathematics education research (Mensah, Okyere, & Kuranchie, 2013). Beside cognitive factors, students' attitude also has been accepted as a key factor that influences students' achievement (Mensah et al., 2013; Abu & Leong, 2014). According to Ayob and M. Yasin (2017), positive perceptions of mathematics learning among students will develop positive attitudes towards mathematics and lead to higher achievement.

The definition of mathematics attitude has been expanded based on three components, namely, affective (i.e. emotional and beliefs), behaviour and cognitive (Ayob & M. Yasin, 2017). Positive attitudes towards mathematics affect students' willingness to learn mathematics compared with students with negative mathematics attitude, and once they feel that mathematics is important, they will try to improve their mathematics achievement (Ajisukmo & Saputri, 2017).

On the other hand, academic achievement is a significant concern in educational learning and has become one of the most crucial objectives for students, their families, and other stakeholders. It represents an individual student's ability to efficiently and effectively utilise knowledge to meet their learning needs and academic goals (Mehmood, 2013 as cited in Alzabidi et al., 2024). According to Maraichelvi and Rajan (2013 as cited in Alzabidi et al., 2024), students' performance refers to the quality of their effort or work in fulfilling academic requirements at school or college. Traditionally, academic performance measures the extent to

which students have acquired the targeted knowledge, skills, and aptitudes (Preeti, 2013 as cited in Alzabidi et al., 2024).

Therefore, this study aims to analyze the findings of previous studies on students' attitude toward mathematics and its relationship with academic achievement. Through a comprehensive literature analysis, this study aims to identify patterns and consensus in those previous studies. It is necessary to uncover the psychological and emotional factors that influence learning by investigating key constructs of students' attitude toward mathematics and its relationship with academic achievement. The findings can help teachers and school administrators develop strategies to improve students' attitudes toward mathematics, thereby enhancing classroom engagement and academic success.

1.1 Research Objectives:

1. To examine the construct of students' attitude in learning mathematics.
2. To explore the relationship between students' attitude and students' achievement in learning mathematics.

1.2 Research Questions:

1. What are the key constructs of students' attitude in learning mathematics?
2. Is there a significant relationship between students' attitudes and their academic achievement in learning mathematics?

1.3 Definition of Terms:

Students' Attitude

A student's attitude is their tendency to respond a certain way towards something. Naturally, the student's response can be on a continuum of positive to negative or good to bad. It is essential to mention that attitude is considered a psychological construct. This means the consequences of the attitude can be seen but not the attitude itself (Thomas, D., 2021). On the other hand, Space.J (2023) believes that student attitudes are the emotional and cognitive approaches a student demonstrates in an academic situation such as class or subject. These are the basis for a student's behaviours and greatly affected learning outcomes.

Academic Achievement

Academic achievement is an indication of learning outcomes that denotes the level to which the student has accomplished particular learning goals and illustrates the student's proficiency in curriculum activities. It generally refers to the communicative, statistical, science, social science, and intellectual skills and capabilities that allow students to excel in academics and society. (Lindholm-Leary et al., 2006)

Mathematics

Mathematics is a broad and foundational field of study that encompasses various branches such as arithmetic, geometry, algebra, and trigonometry. It is characterized by systematic reasoning and structure, utilizing a variety of symbols and interpretations to form a universal language of discourse. Including engineering, where it is used to solve practical problems, mathematics is integral to daily life and various fields. For understanding and solving problems across various domains,

Mathematics is a diverse and essential discipline that serves as a universal language. It is deeply embedded in both everyday life and specialized fields, providing a framework for logical reasoning and precise communication. (Nasution et al., 2020)

2. Methodology

This study employs a comprehensive literature review methodology, analyzing journal articles, conference papers, and other scholarly sources from major academic databases like Google Scholar. Keywords such as "academic achievement," "mathematics education," and "students attitude" were used. Relevant studies published in the last ten years were selected to ensure the information's relevance and novelty. The data was qualitatively analyzed to identify the main themes related to students' attitude toward mathematics and its relationship with academic achievement.

3. Results of Analysis

This study found that students' attitudes significantly influence students' academic achievement in Mathematics. This section presents the results of the analysis of previous studies on students' attitudes toward mathematics and their relationship with academic achievement. The table 1 shows the analysis categorised by authors, dimension, research design and major findings from the previous studies.

Table 1: The Qualitative Analysis of Effect of Student' Attitude toward Academic Achievement

Author (Year)	Dimension	Research Design IV → DV	Major Findings
1. Suriati Abu Bakar & Ahmad Fauzi Mohd Ayub (2020)	Students' Attitude towards Mathematics: 1. Self- confidence 2. Value 3. Enjoyment 4. Motivation	Quantitative approach: Correlational Attitude Towards Mathematics → Mathematical Problem - Solving Achievement	1. Significant positive relationship between the overall attitude towards mathematics with mathematical problem -solving achievement ($r = 0.489^{**}$, $p < 0.001$).
2. Anas Seidu Salifu & Adamu Bakari (2022)	Students' Perception, Interest and Mathematics Achievement.	Quantitative approach: Descriptive survey Students' Perception and Interest → Mathematics Achievement	1. A positive, moderate and significant relationship was recorded between students' interest and achievements in mathematics. 2. A positive weak correlation between students' perception and achievement in mathematics which is also significant. 3. Weak positive significant correlation was recorded for the relationship between students' perception and interest towards mathematics.
3. Seowon Song, Tianyu Li, Michaela Quintero & Zhe Wang (2023)	Math Anxiety and Math Achievement: The Role of After School Learning	Longitudinal study, cross-sectional Study Math Anxiety → Math Achievement	1. Math anxiety and math achievement were modestly negatively correlated. 2. Higher math anxiety was associated with more negative math homework behaviors and less frequent participation in math extracurricular activities. 3. The negative association between math anxiety and math achievement was partially mediated by homework behaviors and participation in math

			extracurricular activities.
4. Keziah Jofressel H. Salinas, Jecyl Ramayla Tolibao, & Dr. Jerald C. Moneva (2019)	Students' Anxiety in Mathematics	Quantitative approach: Students' math anxiety → students' performance	<ol style="list-style-type: none"> 1. Students' level of math anxiety is not a variable to determine the relationship of math anxiety levels to the increase or decrease of the mathematics performance of the students. 2. Levels of math anxiety cannot significantly change or affect the mathematical performance of the students based on the results of the computed value of chi-square and critical value. 3. Therefore, no matter what happens to the level of math anxiety: high, average, low, the mathematical performance would still be the same because the level of students' math anxiety does not affect their average.
5. Abdullahi Adamu Dan'inna (2017)	Students' Attitude towards Mathematics as a Predictor of their Academic Achievement in the Subject	Quantitative approach: Descriptive correlational Design. Students' attitude (based gender) → Academic achievement	<ol style="list-style-type: none"> 1. Significant relationship between students' attitudes towards mathematics and their academic achievement in the subject ($r=0.756, P=.00$). Significant gender differences exist in students' attitudes towards mathematics ($t=5.736, P=.00$) in favour of male students. 3. Students' attitudes towards mathematics predicts their academic achievement in the subject and that students have different attitudes towards mathematics.
6. Nazir Haider Shah, Nadia Nazir, Mahek Arshad, Khatiba Akhter, Abdul Khaliq Shaheen, Sidra Younas & Faheem Ghazanfar (2023)	Students' attitude: 1. Motivation 2. Confidence 3. Importance 4. Anxiety	Quantitative approach: Descriptive survey Students' attitude → Mathematic Achievement	<ol style="list-style-type: none"> 1. The current study's findings revealed that students' attitudes towards Mathematics had a significant impact on secondary school mathematics achievement. 2. It is concluded that student attitudes' parameters like confidence, motivation, importance and anxiety towards mathematics had a significant positive effect on their achievement in Mathematics at the secondary level in AJ&K.
7. Robert Wakhata, Vé daste Mutarutinya & Sudi Balimuttajjo (2022)	Secondary school students' attitude towards mathematics word problems	Quantitative approach: Explanatory sequential quasi-experimental design Students' attitude → Linear programming (LP) mathematics word problems (LPMWPs)	<ol style="list-style-type: none"> 1. Positive relationship between students' attitude towards LPMWPs. 2. Enjoyment, motivation, and confidence were weakly negatively correlated while usefulness was positively correlated. 3. No significant statistical relationship between students'

			attitudes towards LPMWPs and their age, gender, school location, school status, and school ownership.
8. Shalini Kuppusamy & Muzirah Musa (2021)	Investigating International School Secondary students' Attitude towards Mathematics: <ul style="list-style-type: none"> - Self-efficacy - Seeking-help - Self-judgement - Self-reaction - Mathematics anxiety - Beliefs in the utility of mathematics - Teachers' involvement 	Quantitative approach: online questionnaire Factors that influence students' attitude → Students' attitude towards mathematics	<ol style="list-style-type: none"> 1. The study found positive correlation between the students' attitude and their performance in mathematics. 2. The most attitude factor that contributes to the students' performance is self-efficacy. 3. Students of the age range from 11 - 16 years old have shown a positive attitude in learning mathematics with the highest positive attitude shown by students between the ages of 15 - 16 years old. 4. The findings reveal that as students get older, their perspective on learning mathematics increases.
9. Aini Shuhaimah Selamat, Zarith Sofiah Othman & Siti Salwana Mamat (2025)	Secondary school students' attitude and its effect on mathematics achievement: <ul style="list-style-type: none"> - Positive and negative students' attitude - Intrinsic and extrinsic motivation 	Quantitative approach: descriptive survey with a cross-sectional design. Students' attitude and motivation → Students' achievement in mathematics.	<ol style="list-style-type: none"> 1. Research indicates a positive attitude toward learning mathematics by students. 2. They exhibit determination, find joy in studying the subject, and show enthusiasm for learning. 3. Exploring these non-intelligence factors, students exhibit a positive attitude and eagerness toward the subject. 4. However, it's important to highlight that these positive attitudes and high motivation levels do not necessarily translate into better academic performance.
10. Mzomwe Yahya Mazana, Calkin Suero Montero & Respickius Olifage Casmir (2019)	Students' attitudes towards learning Mathematics" <ul style="list-style-type: none"> - Self confidence - Mathematics anxiety - Enjoyment of mathematics - Intrinsic motivation - Perceived usefulness 	Quantitative and Qualitative approach: Mix research Students' attitude → Students' Performance in mathematics	<ol style="list-style-type: none"> 1. The results show that initially students exhibit a positive attitude towards mathematics, but their attitude becomes less positive as the students move forward to higher levels of education. 2. A significant positive weak correlation between students' attitude and performance was established.
11. Saraswati Shakya & Rocky Maharjan (2023)	Students' Attitude towards Mathematics and its Relationship with Mathematics Achievement	Quantitative approach: Correlational research design	<ol style="list-style-type: none"> 1. Positive correlation between students' attitudes towards mathematics and their mathematics achievement. 2. The findings suggest that as students' attitudes become more positive, their performance in mathematics tends to exhibit a concurrent increase.
12. Dr. Moyuri Sarma & Ms.	An Investigation on Attitude Towards	Quantitative and Qualitative approach:	<ol style="list-style-type: none"> 1. The achievement of the students in Mathematics at higher

Minakshi Rabha (2021)	Learning Mathematics Among Higher Secondary School Students - Achievement of the students in mathematics - Gender of the students (Male/ Female). - Type of management of the schools (Government/ Private).	Descriptive Survey method and Personal interview Students' attitude → Students' achievement	secondary level depends on the school environment. 2. The achievement level of the students in private schools is better than the Government schools. 3. The male students show a more positive attitude towards learning Mathematics than the female students.
13. Ms. Jyotirmoyee Pati, Prof. Uttam Kanti Jena & Mr. Mihir Kumar Beura (2024)	Students' attitude towards mathematics - Differences between private and government attitude - Differences between gender.	Quantitative approach: Descriptive survey Students' attitude → Learning mathematics	1. The findings of the study revealed that private secondary school students have a more positive attitude towards mathematics than government secondary schools. 2. It also found that girl students have more positive attitudes than boys.
14. Dhana Kumari Thapa & Tara Paudel (2020)	Secondary School Students' Attitude towards Mathematics 1. Perceived self-efficacy 2. Attitude	Quantitative approach: Cross-sectional descriptive design Perception of self-efficacy and attitude towards mathematics → Learning mathematics	1. Self-efficacy is good i.e. both girls and boys have a positive and good attitude towards mathematics courses. 2. Attitude towards mathematics is less likely to be influenced by gender of students, castes and educational status of parents.

4. Discussion

This section discusses the findings of the literature review in relation to the research questions, with emphasis on synthesizing patterns and identifying key insights from previous studies.

Research Question 1: What are the key constructs of students' attitude in learning mathematics?

From the analysis of 14 articles shown in table 1, there are several constructs of students' attitude in learning mathematics discussed. Students' attitude towards mathematics is defined as a multidimensional psychological construct that integrates emotional responses, cognitive beliefs, and behavioural tendencies. Most research frameworks categorize these attitudes into three primary domains: the affective component, which involves feelings such as liking or disliking the subject; the cognitive component, relating to beliefs about the subject's value and one's own competence; and the behavioural component, which refers to a student's tendency to act through participation and persistence. Within these domains, several core dimensions are frequently analyzed, especially self-confidence regarding mathematical performance, the perceived value or functionality of mathematics for future careers, the degree of enjoyment or interest found in mathematical tasks, and the motivation to pursue further study. Negative constructs also play a critical role in shaping this attitude, particularly mathematics anxiety that is characterized by feelings of tension, apprehension, fear and self-doubt regarding one's ability to master difficult concepts or achieve good grades. Furthermore, these internal attitudes are also influenced by social and contextual factors, including the perceived expectations and motivation from teachers and parents, as well as broader outlooks on the subject's logic, reasoning, and its applicability to the individual and the real life.

Research Question 2: Is there a significant relationship between students' attitudes and their academic achievement in learning mathematics?

Previous research indicates a significant positive correlation between students' attitudes and their academic achievement in mathematics, though the findings exhibit variability across studies. Attitudes are considered key predictors, with positive mindsets promoting higher achievement and negative ones leading to poor performance. For example, a study by Abdullahi Adamu Dan'inna (2017) showed a strong correlation ($r=0.756$) between these variables, indicating that success relies heavily on students' internal attitudes. Factors influencing this relationship include self-confidence, motivation, perceived value of mathematics, and enjoyment of the subject. However, inconsistencies exist; a positive attitude does not always result in better exam performance, as factors such as intelligence, context, and mathematics anxiety can complicate outcomes. Additionally, large-scale analyses suggest that while a positive relationship is present, attitude may only explain a small variance (7.8%) in achievement when considering external factors like home resources and teacher effectiveness. (Hwang & Son, 2021)

5. Conclusions

In conclusion, this study found that students' attitude has a significant influence on student academic achievement in Mathematics consistent with previous studies in table 1. A study by R. Ajisuksmo and G. R. J. C. E. Saputri (2017), revealed a strong relationship between students' attitudes towards Mathematics and their Mathematical achievement. Also, the findings of M. S. Farooq, S. Z. U. Shah, and S (2008) revealed that confidence was the most important factor in students' attitude towards Mathematics, and that it had a significant influence on their grades.

According to Zan and Di Martino (2007), students' attitude towards Mathematics was characterized as the emotional response to Mathematics, whether positive or negative, confidence in one's ability to succeed in Mathematics, and techniques for dealing with Mathematical issues. Previous research on Mathematics found that attitude toward Mathematics played an important role in determining learning achievement in Mathematics, with students who had positive attitudes toward Mathematics performed well (De-La-Peña et al., 2021; Güner, 2012; Tapia & Marsh, 2004; Zan & Di Martino, 2007)

Furthermore, key students' attitude constructs such as self-confidence and motivation; students who believe in their abilities and value mathematics are more likely to succeed. However, inconsistencies exist, such as performance gaps where positive attitudes do not guarantee high marks, and the impact of anxiety, which can vary. Demographic factors, including gender and institutional support, influence attitude development, with private school students often displaying more positivity. Overall, while a positive attitude is crucial for success, it interacts with various psychological and contextual factors to determine academic outcomes in mathematics.

Hence, addressing these factors through an integrated and comprehensive approach is crucial for improving student outcomes and reducing failure rates in mathematics. The education institutions should focus on improving teaching quality, providing adequate academic support, and creating a supportive learning environment to enhance Mathematics education. The involvement of the teacher is also important to develop positive relationships with students and stress classroom activities that involve an active teaching-learning process and students'

participation in the class. Additionally, active involvement of parents in their children's education can also play a crucial role to help reduce student failure rates and increase positive students' attitude. Thereby, in order to increase the success rate in mathematics, the responsibility not solely on the students but also other people around them also can play their role in shaping good students' attitude in learning mathematics which can lead to higher academic achievement in mathematics.

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Conflict of Interest Statement

The authors declare that there is no conflict of interest regarding the publication of this study.

References

- Abu Bakar, S., & Mohd Ayub, A. F. (2020). Relationship Between Attitude Towards Mathematics and Mathematical Problem-Solving Achievement Among Pre-University Students in Malaysia. <https://www.akademisains.gov.my/asmsj/article/relationship-between-attitude-towards-mathematics-and-mathematical-problem-solving/>
- Abu, N. E., & Leong, K. E. (2014). Hubungan antara sikap, minat, pengajaran guru dan pengaruh rakan sebaya terhadap pencapaian Matematik tingkatan 4. *Jurnal Kurikulum & Pengajaran Asia Pasifik*, 2(1), 1–10. <https://doi.org/10.11113/jt.v39.477>
- Alzabidi, T., Nordin, M. S., & Saleh, R. R. (2024). Academic performance and academic self-efficacy among pre-university students in Malaysia. *IUM Journal of Educational Studies*, 12(1), 4–23. <https://doi.org/10.31436/ijes.v12i1.455>
- Ajisuksmo, C. R., & Saputri, G. R. (2017). The influence of attitudes toward mathematics and metacognitive awareness on mathematics achievement. *Creative Education*, 8(3), 486–497. <https://doi.org/10.4236/ce.2017.83037>
- Ayob, A., & M. Yasin, R. (2017). Factors affecting attitudes towards mathematics. *International Journal of Academic Research in Business and Social Sciences*, 7(11), 1100–1109.
- Dan'inna, A. A. (2017). Students' attitude towards mathematics as a predictor of their academic achievement in the subject. *Journal of Creative Writing*, 3(2), 1–22. <https://doi.org/10.70771/jocw.v3i2.31>
- De-La-Peña, C., Fernández-Cézar, R., & Solano-Pinto, N. J. (2021). Attitude toward mathematics of future teachers: How important are creativity and cognitive flexibility? *Frontiers in Psychology*, 12, Article 713941. <https://doi.org/10.3389/fpsyg.2021.713941>
- Farooq, M. S., Shah, S. Z. U., & Arif, S. (2008). Students' attitude towards mathematics. *Pakistan Economic and Social Review*, 46(1), 75–83.
- Güner, N. (2012). Using metaphor analysis to explore high school students' attitudes towards learning mathematics. *Educational Sciences: Theory & Practice*, 12(2), 133–139.
- Hoy, W. K. (2012). *School characteristics that make a difference for the achievement of all students: A 40-year odyssey*. Information Age Publishing.
- Hwang, S., & Son, T. (2021). Students' attitude toward mathematics and its relationship with mathematics achievement. *Journal of Education and e-Learning Research*, 8(3), 272–280. <https://doi.org/10.20448/journal.509.2021.83.272.280>

- Khalid, M. (2017). Fostering problem solving and performance assessment among Malaysian mathematics teachers. *Sains Humanika*, 9(1–2), 51–55. <https://doi.org/10.11113/sh.v9n1-2.1098>
- Kuppusamy, S., & Musa, M. (2021). Investigating international school secondary students' attitude towards mathematics. *Jurnal Pendidikan Sains dan Matematik Malaysia*, 11(2), 122–130. <https://doi.org/10.37134/jpsmm.vol11.2.10.2021>
- Lindholm-Leary, K., & Borsato, G. (2006). Academic achievement. In *Educating English language learners: A synthesis of research evidence* (pp. 176–222). <https://doi.org/10.1017/CBO9780511499913.006>
- Mazana, M. Y., Montero, C. S., & Casmir, R. O. (2019). Investigating students' attitude towards learning mathematics. *International Electronic Journal of Mathematics Education*, 14(1), 207–231. <https://doi.org/10.29333/iejme/3997>
- Maraichelvi, A., & Rajan, S. (2013). The relationship between emotional intelligence and the academic performance among final year undergraduates. *Universal Journal of Psychology*, 1(2), 41–45. <https://doi.org/10.13189/ujp.2013.010203>
- Mehmood, S. (2013). The effects of social networking sites on the academic performance of students in College of Applied Sciences, Nizwa, Oman. *International Journal of Arts and Commerce*, 2, 111–125.
- Mensah, J. K., Okyere, M., & Kuranchie, A. (2013). Student attitude towards Mathematics and performance: Does the teacher's attitude matter? *Journal of Education and Practice*, 4(3), 132–139
- Nasution, M., Sitompul, O., Nasution, S., Aulia, I., & Elveny, M. (2020). Mathematics. *Journal of Physics: Conference Series*, 1566, 012030. <https://doi.org/10.1088/1742-6596/1566/1/012030>
- Pati, J., Jena, U. K., & Beura, M. K. (2024). Attitude of secondary school students' towards mathematics. *Integrated Journal for Research in Arts and Humanities*, 4(2), 92–96. <https://doi.org/10.55544/ijrah.4.2.15>
- Preeti, B. (2013). Role of emotional intelligence for academic achievement for students. *Research Journal of Educational Sciences*, 1(2), 8–12.
- Rabha, M., & Sarma, M. (2021). An investigation on attitude towards learning mathematics among higher secondary school students. *Psychology and Education: An Interdisciplinary Journal*, 58(2), 6393–6398. <https://doi.org/10.17762/pae.v58i2.3165>
- Salifu, A. S., & Bakari, A. (2022). Exploring the relationship between students' perception, interest and mathematics achievement. *Mediterranean Journal of Social & Behavioral Research*, 6(1), 13–20. <https://doi.org/10.30937/mjosbr/11491>
- Salinas, K. J. H., Tolibao, J. R., & Moneva, J. C. (2019). Student's anxiety in mathematics. *International Journal of Novel Research in Education and Learning*, 6(1), 46–55.
- Selamat, A. S., Othman, Z. S., & Mamat, S. S. (2025). Secondary school students' attitude and its effects on mathematics achievement. *Malaysian Journal of Computing*, 10(1), 2001–2011. <https://doi.org/10.24191/mjoc.v10i1.4545>
- Shah, N. H., Nazir, N., Arshad, M., Akhter, K., Shaheen, A. K., Younas, S., & Ghazanfar, F. (2023). Effect of students attitude towards mathematics on their mathematical achievement at secondary school level. *International Journal of Emerging Technologies in Learning (iJET)*, 18(12), 178–192. <https://doi.org/10.3991/ijet.v18i12.38765>
- Shakya, S., & Maharjan, R. (2023). Students' attitude towards mathematics and its relationship with mathematics achievement. *Mangal Research Journal*, 4(01), 29–40. <https://doi.org/10.3126/mrj.v4i01.61718>
- Song, S., Li, T., Quintero, M., & Wang, Z. (2023). The link between math anxiety and math achievement: The role of afterschool learning. *Journal of Numerical Cognition*, 9(3), 418–432. <https://doi.org/10.5964/jnc.11325>

- Spacey, J. (2023, October 25). 95 Examples of Student Attitudes - Simplicable. Simplicable Guide. Retrieved March 10, 2025, from <https://simplicable.com/edu/student-attitudes>
- Thomas, D. (2021, January 3). Attitude and Behavior of Students. educational research techniques. Retrieved March 10, 2025, from <https://educationalresearchtechniques.com/2021/01/03/attitude-and-behavior-of-students/>
- Tapia, M., & Marsh, G. E. (2004). An instrument to measure mathematics attitudes. *Academic Exchange Quarterly*, 8(2), 16–21.
- Thapa, D. K., & Paudel, T. (2020). Secondary school students' attitude towards mathematics. *Mathematics Education Forum Chitwan*, 5(5), 34–39. <https://doi.org/10.3126/mefc.v5i5.34761>
- Wakhata, R., Mutarutinya, V., & Balimuttajjo, S. (2022). Secondary school students' attitude towards mathematics word problems. *Humanities and Social Sciences Communications*, 9, Article 444. <https://doi.org/10.1057/s41599-022-01449-1>
- Zan, R., & Di Martino, P. (2007). Attitude toward mathematics: Overcoming the positive/negative dichotomy. *The Montana Mathematics Enthusiast*, 3(1), 157–168.