



A Comparative Study of Students' Attitudes toward Mathematics in Southeast Asia: Evidence from Indonesia and Thailand

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Abstract: This study aims to explain students' attitudes toward mathematics in Southeast Asia, focusing on Indonesia and Thailand. Students' attitudes towards mathematics significantly influence their learning success and academic motivation. This quantitative study involved 494 secondary school students from Indonesia and Thailand. The instrument used was the Fennema-Sherman Mathematics Attitude Scales (F-SMAS) questionnaire with a two-way analysis of variance (ANOVA). The findings indicate that gender did not show substantial differences in Indonesia and Thailand at the secondary school level, but country of origin did. In Indonesia and Thailand at the secondary school level showed more positive attitudes towards mathematics than Thai students as seen from the higher average scores in self-confidence (Indo: 3.57, Thai: 3.11), greater maternal support (Indo: 3.67, Thai: 3.25), more optimistic perceptions about the usefulness of mathematics better preposition more optimistic perceptions of the usefulness of mathematics (Indo: 3.78, Thai: 3.39), and higher motivation (Indo: 3.32, Thai: 3.12). While there were no significant gender differences between the two countries, the stereotype of mathematics as a male domain was more pronounced in Indonesia (Indo: 3.55, Thai: 3.31), highlighting critical areas for intervention in the education system and the promotion of inclusive attitudes toward mathematics. These findings are expected to enhance the formulation of more contextual educational policies and encourage greater interest and achievement in mathematics among students in the Southeast Asian region.

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Introduction

Mathematics is a significant subject taught in diverse educational systems globally, including those in Southeast Asian nations (Roberts et al., 2024). This subject is crucial in cultivating students' cognitive skills and underpins the progress of world science, technology, and economics (Hanushek & Woessmann, 2008). Consequently, it is important to learn how students perceive and react to mathematics education, particularly in light of the myriad problems they encounter in this discipline. A significant factor affecting mathematics learning outcomes is students' attitudes about the subject.

Students' attitudes toward the subject mathematics include their emotions, beliefs, and motivation toward mathematics and mathematical tasks sounds more academical (Liljedahl & Oesterle, 2020; Masserang, 2021), significantly influencing their academic progress (Hussein & Csikos, 2023; Wen & Dubé, 2022). Positive attitude toward mathematics can enhance students' interest, engagement, and academic achievement in the subject (Irvine, 2020; Mazana et al., 2019) while also fostering greater motivation, engagement, and confidence in their learning process (Nurbavliyev, O., Kaymak, S., & Sydykov, 2022). Conversely,

detrimental attitudes, including fear, boredom, or lack of confidence, can impede the development of mathematical skills and negatively impact students' academic performance (Mazana et al., 2019), potentially hindering their growth and diminishing their overall achievement (Dewaele et al., 2023; Li & Wei, 2023). The evidence indicates that students' perceptions of mathematics are intricately linked to their academic performance, which subsequently influences their preparedness to confront future professional challenges. Research on students' attitudes toward mathematics has been undertaken in numerous countries; however, comparative studies of these attitudes among students in Southeast Asian nations remain scarce.

Understanding students' attitudes toward mathematics is becoming increasingly significant in Southeast Asia, a region characterized by cultural variety and diverse educational institutions. Despite numerous initiatives aimed at enhancing the quality of mathematics education in Southeast Asian nations, the obstacles to fostering a favorable attitude toward mathematics remain significant. Indonesia and Thailand, although geographically proximate, possess different educational frameworks and face significant issues regarding mathematical education.

Many students in Indonesia continue to have negative attitudes toward mathematics, despite numerous initiatives aimed at enhancing the quality of mathematics education through regularly revised curricula and teacher training (Wijaya, T. T., Hidayat, W., Hermita, N., Alim, J. A., & Talib, 2024). Numerous reforms enacted in the curriculum and teacher training to enhance the quality of mathematics education have not mitigated the challenges that many students continue to encounter in this subject (Shaturaev, 2021). Data from the Program for International Student Assessment (PISA) indicates that numerous Indonesian students experience diminished confidence and heightened anxiety when confronted with mathematical problems (Wijaya, T. T., Hidayat, W., Hermita, N., Alim, J. A., & Talib, 2024). Factors such as unengaging teaching methods, a heavy curriculum, and a focus on memorizing facts make it difficult for students to develop a positive attitude towards mathematics (Saha et al., 2024).

In Thailand, despite a comparably similar education structure, international assessments like TIMSS (Trends in International Mathematics and Science Study) indicate that Thai pupils encounter difficulties in acquiring mathematics (Siriwat, 2017). The quality of education in this country has improved, as demonstrated by international assessments like the Trends in International Mathematics and Science Study (TIMSS), which reveal that students' attitudes towards mathematics still want further attention (Roberts et al., 2024). Many Thai students experience anxiety or disinterest in mathematics, potentially due to conventional pedagogical approaches and the absence of contextual relevance to their everyday experiences (Payadnya et al., 2024).

In this context, investigating students' attitudes toward mathematics in Indonesia and Thailand is highly relevant. Both countries share several cultural similarities. However, the 2022 PISA scores differed, with Thailand ranking above Indonesia. Therefore, this study aims to investigate students' attitudes toward mathematics in both countries, using the Fennema-Sherman Mathematics Attitudes Scale as a framework. The attitudes of students towards mathematics, as measured by the Fennema-Sherman Mathematics Attitude Scales (Takunyaci et al., 2019).

This study was conducted to address the scarcity of literature on students' attitudes toward mathematics in Southeast Asia, particularly Indonesia and Thailand. Although existing studies have examined students' attitudes toward mathematics, they have focused on a single variable, such as anxiety or motivation (Hussein & Csíkos, 2023; Nyman, 2020).



Studies assessing attitudes toward mathematics have used the Fennema-Sherman Mathematics Attitude Scale (FSMAS), but none have applied this instrument in a comparative study between Indonesia and Thailand. This study adopted the Fennema-Sherman Mathematics Attitude Scale (FSMAS), which remains relevant today because it can offer a deeper understanding by assessing multiple dimensions, including math anxiety, self-confidence, motivation, and the impact of parents and teachers, which are typically underexplored in cross-country comparisons across various social and cultural contexts.

While industrialized nations extensively utilize FSMAS, its implementation in Southeast Asian countries remains constrained (Fortune & Spangenberg, 2023; Suherman & Vidákovich, 2022). Fennema & Sherman have developed and validated this scale for assessing various dimensions of attitudes toward mathematics; however, comparative studies between countries with disparate educational systems and cultures (Fennema & Sherman, 1996; Takunyaci et al., 2019), such as Indonesia and Thailand, remain limited. Several studies in Southeast Asia, particularly in Malaysia and Singapore, have demonstrated variations in attitudes toward mathematics influenced by cultural and social factors (Gao et al., 2023). However, research employing this scale concurrently in two countries with distinct backgrounds, such as Indonesia and Thailand, remains scarce. Furthermore, investigations into the impact of parents and educators on students' attitudes remain scarce, despite their crucial role in shaping students' perceptions of mathematics (Hidayatullah & Csikos, 2024).

This study aims to explain students' attitudes towards mathematics in Southeast Asia, focusing on Indonesia and Thailand. It provides a comprehensive approach by assessing a broader range of student attitudes based on the Fennema-Sherman Mathematics Attitude Scale (FSMAS). This research can provide academic understanding of students' attitudes toward mathematics and offer recommendations for more adaptive educational approaches in both countries.

Research Method

This study employed a comparative quantitative design to examine students' attitudes toward mathematics in Indonesia and Thailand. Both regions have similarities such as strong local traditions, being far from city centers, and the communities' livelihoods are primarily based on farming. We employ a comparative method to determine whether different geographical and cultural contexts influence notable disparities in students' attitudes toward mathematics. This study employs the Fennema-Sherman Mathematics Attitude Scales (F-SMAS), a questionnaire intended to assess multiple facets of students' attitudes toward mathematics. F-SMAS comprises nine principal scales: (1) Mathematics Anxiety Scale, (2) Confidence in Learning Mathematics, (3) Perceived Usefulness of Mathematics, (4) Effectance Motivation in Mathematics, (5) Attitude towards Achievement in Mathematics, (6) Mathematics as a Field of Study for Males, (7) Mother Scale, (8) Father Scale, and (9) Teacher Scale. The questionnaire comprises 27 items, with each scale containing three statement items. Each item is evaluated with a 5-point Likert scale. For affirmative assertions, the scoring scale extends from 1 (strongly disagree) to 5 (strongly agree); however, for negative claims, the scale is inverted, with 1 representing (strongly agree) and 5 indicating (strongly disagree). This instrument was adopted from the Fennema-Sherman Mathematics Attitude Scale (FSMAS) used by Takunyaci et al., which was validated and reliable. (Takunyaci et al., 2019).

The 494 students comprised 248 students from West Nusa Tenggara Province in Indonesia and 246 from Sangkhom District, Nong Khai Province in Thailand. Details of the study subjects can be seen in Table 1.

Table 1. Characteristics of Respondents

Country	Junior High School		Senior High School		Total
	Male	Female	Male	Female	
Indonesia	6	96	56	90	248
Thailand	8	106	62	70	246
Total	14	202	118	160	494

Data were analyzed descriptively to determine students' attitudes toward mathematics based on the Fennema-Sherman Mathematics Attitude Scale (FSMAS). A two-way analysis of variance (ANOVA) was used to assess variations in students' attitudes toward mathematics, contingent upon gender and country of origin. Statistical tests used Jeffrey's Amazing Statistics Program (JASP) software version 0.18.3.0 (Goss-Sampson, 2024). All statistical tests were conducted at a significance level of 0.05 ($\alpha = 0.05$), indicating that results are considered significant if the p-value is lower than 0.05.

Results and Discussion

Data Exploration

Students' attitudes towards mathematics using the Fennema-Sherman Mathematics Attitude Scale (FSMAS) between Indonesian students and Thai students are presented with the scores of each statement on each student's scale towards mathematics in Table 2 and the average score of each statement on each student's scale towards mathematics is presented in Table 3.

Table 2. Statement Data on Each Indicator of the Fennema-Sherman Mathematics Attitude Scales (F-SMAS) for Indonesia and Thailand

Indicators	Statement	Junior High School		Senior High School	
		Indo	Thai	Indo	Thai
Belief	C+	3.65	3.44	3.79	3.14
	C-	3.29	2.63	3.19	2.77
	C-	3.47	3.47	4.01	3.17
Mother's Scale	M+	3.41	3.4	3.42	3.17
	M-	3.47	3.18	3.47	3.11
	M+	4.12	3.42	4.11	3.23
Attitude Towards Success in Mathematics	AS+	3.59	3.79	4.12	3.26
	AS-	3.5	2.93	2.99	2.86
	AS-	3.09	2.65	2.63	3
Teacher Scale	T-	3.59	3.19	3.97	2.95
	T+	3.35	3.46	3.55	3.17
	T+	3.76	3.3	4.01	3.27
Mathematics Utility Scale	U-	3.94	3.65	4.38	3.14
	U+	3.26	3.14	2.77	3.17
	U+	4.12	3.77	4.47	3.47
Mathematics Anxiety Scale	A-	3.56	2.96	3.48	3.15
	A+	3.47	3.75	4.03	3.15
	A+	3.62	3.26	3.88	3.09
Effective Motivation in Mathematics	E-	2.82	3.07	2.93	2.80
	E+	3.53	3.37	3.60	3.03
	E+	3.44	3.44	3.59	3.02
Mathematics as a Male Domain	MD+	3.50	3.63	3.59	3.29
	MD-	2.74	2.95	2.89	2.91
	MD+	4.03	3.67	4.55	3.36
Father's Scale	F+	3.65	3.32	3.74	3.29

Indicators	Statement	Junior High School		Senior High School	
		Indo	Thai	Indo	Thai
	F+	3.50	3.44	3.63	3.23
	F-	2.91	2.75	2.71	3.38

Table 3. Data on Each Indicator of the Fennema-Sherman Mathematics Attitude Scales (F-SMAS) for Indonesia and Thailand

Indicators	Junior High School		Senior High School	
	Indo	Thai	Indo	Thai
Belief	3.47	3.18	3.67	3.03
Mother's Scale	3.67	3.33	3.67	3.17
Attitude Towards Success in Mathematics	3.39	3.12	3.25	3.04
Teacher Scale	3.57	3.32	3.84	3.13
Mathematics Utility Scale	3.77	3.52	3.87	3.26
Mathematics Anxiety Scale	3.55	3.33	3.79	3.13
Effective Motivation in Mathematics	3.26	3.29	3.37	2.95
Mathematics as a Male Domain	3.42	3.42	3.68	3.19
Father's Scale	3.35	3.17	3.36	3.30

Based to Table 2, the mother scale score in Thailand (3.42) is lower than in Indonesia (4.12). Mothers have a close relationship with their children in the context of education, especially mathematics. Therefore, this may indicate that Indonesian mothers tend to show stronger involvement in their children's academic success as a family responsibility, and there are differences in parenting styles. On Mathematics Utility Scale, Indonesia scored higher (4.47) than Thailand (3.77), as they consider mathematics a valuable and necessary subject. This indicates that Indonesian students strongly believe that mathematics is an important tool for achieving higher education, good jobs, and improving social status. On the Mathematics Scale as a male domain, Indonesia's score (4.55) was higher than Thailand's (3.36). In Indonesia, gender stereotypes related to mathematics are still quite strong and felt in school and family culture compared to Thailand which is more moderate. In Indonesia, family and school culture are still influenced by patriarchal patterns. Meanwhile, in Thailand, gender perceptions of mathematics are more relaxed.

Based on Table 3, the scores for each scale of students' attitudes towards mathematics in Thailand are consistently lower than in Indonesia. In Indonesia, the Mathematics Utility Scale (3.87) is the highest and the Attitude Towards Success in Mathematics Scale is the lowest (3.25). Meanwhile, in Thailand, the Mathematics Utility Scale (3.52) is the highest and the Effective Motivation in Mathematics scale (2.95) is the lowest. Both countries have in common that they have the same understanding of the practical value of mathematics. Meanwhile, the lower Attitude Towards Success in Mathematics scale in Indonesia shows that students still consider mathematics important and continue to study hard, but they do not yet feel comfortable, confident, and proud of the possibility of success in mathematics. In Thailand, the lowest scale is Effective Motivation in Mathematics, indicating that students' motivation in learning mathematics is not truly strong, stable, or effective. This means that many students may study mathematics out of obligation, pressure, or fear of failure rather than from a healthy and sustainable internal drive.

Indonesian pupils, at both junior and senior high school levels, exhibit a more favorable disposition towards mathematics than their Thai counterparts. They possess elevated self-confidence, enhanced parental support, a more optimistic perception of the utility of mathematics and the role of teachers, in addition to heightened motivation. Nevertheless, gender stereotypes perceiving mathematics as a male domain remain more

pronounced in Indonesia, highlighting a critical area for intervention in educational systems and the promotion of inclusive attitudes towards mathematics.

Correlation of Variables

The correlation analysis results utilizing the Spearman Rho test indicate a value of $\rho = -0.051$ with a p-value of 0.452 for junior high school students, and $\rho = 0.039$ with a p-value of 0.517 for senior high school students for the gender variable. This indicates that, for the gender variable, the p-value for both SMP and SMA levels exceeds the significance threshold (α) of 5%. The gender variable did not significantly influence students' views toward mathematics at both junior high and senior high school levels.

The correlation coefficient ρ is -0.150 with a p-value of 0.028 for junior high school, and ρ is -0.458 with a p-value of 0.000 for senior high school regarding the country of origin variable. The p-value for the variable of country of origin is less than the significance level (α) of 5% for both middle school and high school levels. The variable of country of origin significantly influences students' attitudes towards mathematics at both junior high school and senior high school levels.

Table 4. Correlation Matrix of Research Variable (Bolded = Junior High School, unbolded = Senior High School)

			Mathematical Attitude	Gender	Nationality
Spearman's rho	Mathematical Attitude	Correlation Coefficient	1.000	0.039	-0.458
		p-value	.	0.517	0.000
		N	278	278	278
	Gender	Correlation Coefficient	-0.051	1.000	-0.087
		p-value	0.452	.	0.148
		N	216	278	278
	Nationality	Correlation Coefficient	-0.150	-0.023	1.000
		p-value	0.028	0.737	.
		N	216	216	278

Normality Test of The Student Attitudes towards Mathematics Data for the Junior and Senior High School Levels

Figure 1 indicates that the data about students' attitudes toward mathematics at both junior high and senior high school levels are aligned along a linear trajectory. Consequently, the students' views toward mathematics at both junior high and senior high school levels exhibit a normal distribution

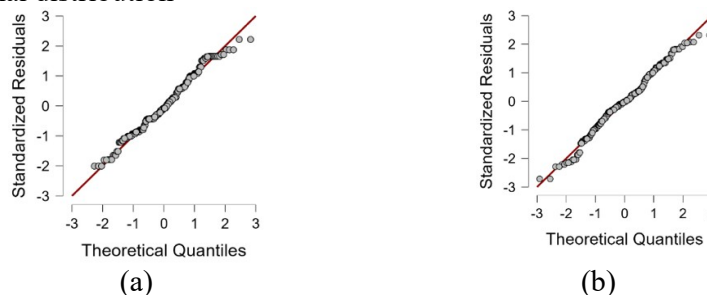


Figure 1. Q-Q Plot of Student Attitude on Mathematics, (a) Junior High School, (b) Senior High School

Homogeneity Test of Student Attitudes Toward Mathematics at the Junior High School and Senior High School Levels

Table 5 displays the outcomes of the homogeneity analysis on students' attitudes towards mathematics, categorized by gender and country of origin, for both middle school and high school levels. The p-value from Levene's test for the junior high school level is 0.000. This indicates that the p-value is below the significance threshold (α) set at 5%. The data regarding students' attitudes towards mathematics, categorized by gender and place of origin at the junior high school level, is heterogeneous. The p-value from Levene's test for the high school level is 0.173. This indicates that the p-value exceeds the significance level (α) of 5%. The data met the assumption of homogeneity of variance.

Table 5. Homogeneity Test of Student Attitudes Toward Mathematics at the Junior High School and Senior High School Levels

		Levene Statistic	Degree of Freedom (df1)	Degree of Freedom (df2)	p-value
Mathematical Attitude	SMP	7.121	3	212	0.000
	SMA	1.674	3	274	0.173

Description of Students' Attitudes Toward Mathematics at the Junior High School Level in Indonesia and Thailand

The prerequisite test findings indicate that the data about students' attitudes toward mathematics at the junior high school level are normally distributed but heterogeneous. The Kruskal-Wallis test is employed to assess the variations in students' attitudes toward mathematics according to gender and country of origin.

Table 6. Result of Kruskal-Wallis Test

Factors	Statistic	Degree of Freedom (df)	p-value
Gender	0.569	1	0.451
Nationality	4.810	1	0.028

The analytical results in Table 6 indicate that the p-value for gender is 0.451. The result indicates that the p-value exceeds the significance level (α) of 5%. Consequently, there is no disparity in students' views toward mathematics based on gender at the middle school level. In contrast to the gender variable, the p-value for the country of origin variable is 0.028. The result indicates that the p-value is less than the significance level (α) set at 5%. Consequently, students' views about mathematics vary according to their nation of origin at the junior school level.

Description of Students' Attitudes Toward Mathematics at the Senior High School Level in Indonesia and Thailand

The preparatory test findings indicate that students' attitudes toward mathematics at the junior high school level are normally distributed and homogeneous. The method employed to assess the variations in students' attitudes towards mathematics, contingent upon gender and country of origin, is a two-way analysis of variance (Two-Way ANOVA).

Table 7. The Result of Two-Way ANOVA Method

Cases	Sum of Squares	df	Mean Square	F	p-value
Gender	49.148	1	49.148	0.315	0.575
Nationality	11,541.720	1	11541.720	74.047	< .001
Gender * Nationality	147.619	1	147.619	0.947	0.331
Residuals	42,708.277	274	155.870		

The research result shown in Table 7 indicates that the p-value of students' attitudes toward mathematics, stratified by gender at the high school level, is 0.575. This indicates that

the p-value exceeds the significance level (α) of 5%. Consequently, there is no disparity in students' attitudes toward mathematics according to gender at the high school level. Conversely, the p-value for the variable of nation of origin is 0.000. This indicates that the p-value is less than the significance level (α) of 5%. Consequently, students' views about mathematics at the high school level vary according to their place of origin. The disparities in students' views towards mathematics, contingent upon their nation of origin, are illustrated in Table 8. The p-value for the interaction between gender and country of origin is 0.331. The p-value exceeds the significance level (α) of 5%. Consequently, there is no disparity in students' attitudes about mathematics based on gender or place of origin.

Table 9 indicates that the disposition of high school pupils toward mathematics in Indonesia surpasses that of their counterparts in Thailand. This distinction is evident from the marginal mean values of both nations. The marginal means for gender indicate no significant difference in Indonesia. The marginal means by gender indicate a notable disparity in Thailand.

Table 8. Post Hoc Comparison

		Mean Difference	Standard Error	<i>t</i>	<i>p</i> -value
Male of Indonesia	Female of Indonesia	0.626	2.125	0.295	0.991
	Male of Thailand	14.570	2.302	6.330	< 0.001
	Female of Thailand	12.236	2.238	5.466	< 0.001
Female of Indonesia	Male of Thailand	13.944	2.061	6.767	< 0.001
	Female of Thailand	11.610	1.990	5.835	< 0.001
Male of Thailand	Female of Thailand	-2.335	2.177	-1.072	0.707

Table 9. The Marginal Means

Gender	Nationality	Marginal Mean	95% Confidence Interval for Mean Difference		Standard Error
			Lower	Upper	
Male	Indonesia	97.893	94.608	101.177	1.668
Female		97.267	94.676	99.857	1.316
Male	Thailand	83.323	80.201	86.444	1.586
Female		85.657	82.719	88.595	1.492

Discussion

There are no substantial differences in student attitudes toward mathematics by gender in Indonesia and Thailand, at both the junior and senior high school levels. This indicates that male and female students at both educational levels exhibit comparable attitudes towards mathematics, including confidence, motivation, and proficiency. These data substantiate the perspective that the gender disparity in mathematics, especially for emotive dimensions such as attitudes, is diminishing. Research indicates that gender gaps in mathematics performance and attitudes are minimal and often negligible, especially when educational environments provide equal learning opportunities for all students (Hyde et al., 2008; Rončević Zubković et al., 2023). Else-Quest et al. (Else-Quest et al., 2010) corroborate the belief that the gender gap in students' attitudes toward mathematics fluctuates based on social and educational contexts but tends to narrow in countries with inclusive education



systems. Indonesia and Thailand exhibit comparable national education policies that support equal access and participation in education for both genders or male or female students.

However, this study found that mathematics as a male domain in Indonesia is higher than in Thailand. This situation suggests that positive attitudes toward mathematics do not always translate directly into a weakening of gender stereotypes. In the context of Indonesian education, mathematics is often considered an indicator of intelligence and a prerequisite for entering prestigious fields of study or jobs (Meier et al., 2021). Therefore, both male and female students tend to develop positive attitudes toward mathematics in response to academic demands and social expectations. Meanwhile, gender stereotypes about mathematics persist because they are influenced by deeper cultural constructs (Nurlu, 2025). This stereotype can manifest in family environments and classroom learning practices that are dominated by males. This shows that changes in access to and participation in education are occurring more rapidly than changes in cultural values and social perceptions of gender. Therefore, the absence of gender differences in students' attitudes toward mathematics or achievement cannot be directly interpreted as meaning that gender stereotypes have disappeared.

This principle is evident in the national curriculum and pedagogical methods that do not discriminate based on gender. Moreover, according to TIMSS 2019 data, both Indonesia and Thailand exhibit a steady trend regarding gender equality in students' views and performance in mathematics at the secondary education level (Mullis et al., 2019). This trend may also be associated with changing perceptions of the roles of men and women in science and mathematics. Historically, mathematics was often associated with masculine dominance; however, today, both male and female students have equal access to and willingness to pursue the subject. The absence of gender-based differences in attitudes in junior and senior high schools signifies advancement in fostering a supportive and gender-neutral educational atmosphere. Consequently, our findings confirm that gender is no longer the primary difference in students' attitudes toward mathematics in Indonesia and Thailand, at both junior high and senior high school levels. Our finding signifies a favorable prospect for the advancement of more equal and gender-just education in both nations.

Indonesian high school students exhibit a more favorable attitude toward mathematics than their Thai counterparts. This is demonstrated by the higher average attitude ratings of Indonesian students regarding their motivation in learning mathematics, self-efficacy, and the perceived importance of mathematics in their daily lives and academic prospects. A factor that may affect these outcomes is the disparity in curriculum structure and pedagogical methods among countries. The Merdeka Curriculum in Indonesia, progressively adopted in recent years, prioritizes contextual and student-centered learning, thereby increasing student participation in disciplines such as mathematics. Conversely, Thailand continues to encounter difficulties due to the predominance of rote learning methods, which diminish students' engagement in mathematics (OECD, 2018). Furthermore, Indonesia's educational system predominantly emphasizes social values associated with academic achievement, with mathematics frequently serving as a benchmark for students' intelligence and success. This viewpoint also affects students' attitudes toward approaching mathematics with greater seriousness. Research by Niepel et al. (Niepel et al., 2018) indicates that cultural influences and societal expectations for academic achievement significantly affect students' perceptions of science and mathematics disciplines. Data from the 2019 TIMSS survey indicates that while Indonesian students' cognitive performance in mathematics remains below the international average, their affective dispositions, such as interest and self-confidence in mathematics, are comparatively superior to those of several other ASEAN nations, including



Thailand. The evidence suggests that Indonesian pupils possess significant intrinsic motivation for mathematics, despite their academic performance not being perfect. This discovery is significant for policymakers in Thailand, as the low positive disposition toward mathematics may adversely affect students' engagement in STEM disciplines in the long term. Conversely, for Indonesia, this knowledge is a crucial asset in formulating educational policies that consistently promote student engagement in mathematics through appealing and pertinent learning methodologies.

Conclusion

The lack of variation in attitudes toward mathematics between male and female pupils in junior high and high schools in Indonesia and Thailand indicates gender uniformity in both nations. This indicates that the educational systems in Indonesia and Thailand have effectively established a more egalitarian and non-discriminatory learning environment, especially in mathematics. Conversely, high school pupils in Indonesia exhibit a more favorable disposition toward mathematics than their counterparts in Thailand. Such attitudes may be affected by variations in curriculum design, pedagogical methods, and the educational ethos prevalent in both nations. Despite Indonesia's struggles in mathematical cognitive achievement, pupils exhibit more favorable affective attitudes, including enthusiasm and self-confidence, in comparison to their counterparts in Thailand. A favorable attitude toward mathematics is a significant predictor of enhanced student involvement and success in the STEM domain.

Recommendation

This study shows that there are no significant gender differences in attitudes toward mathematics in Indonesia and Thailand, but the stereotype of mathematics as a male domain is still stronger in Indonesia. Meanwhile, Indonesian students tend to have a more positive attitude towards mathematics, supported by self-confidence, the role of teachers, and parental support. Therefore, it is necessary to strengthen gender-inclusive education, such as providing contextual questions that are relevant to real life that are accessible to both male and female students and providing opportunities for female students to become discussion leaders.

For further research, it is recommended to explore the factors that cause the persistence of gender stereotypes in Indonesia, including cultural aspects, school environment, and teaching practices. Furthermore, future research could use a longitudinal approach to examine changes in student attitudes over time, and expand the scope to include other variables such as academic achievement, the use of technology in learning, and the role of educational policy. Furthermore, schools should involve parents in mathematics literacy programs so that a positive home environment can align with school-based activities.

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