STUDENT JOURNAL OF
TECHNOLOGY AND EDUCATIONAL RESEARCH
ISSN (Print): 2945-381X; (Online): 3082-5563 | VOLUME 3, SPECIAL ISSUE 1 (2026)

MATHEMATICS SELF-CONFIDENCE AND PERFORMANCE AMONG FRESHMAN TEACHER EDUCATION STUDENTS IN ISABELA STATE UNIVERSITY

Candy Carabbacan, Karylle Faith Gurobat, Kurt Jhonel Lugares, Nimfa Grace Valdez
Isabela State University – Echague Campus

Keywords:
Mathematics self-confidence, mathematics performance, MMW, first-year BSE students, mathematical ability

DOI:
10.65141/sjter.sp2026.05

Abstract

This study examined the mathematics performance and self-confidence of first-year Bachelor of Secondary Education (BSE) students across four fields of specialization (Mathematics, Filipino, Social Science, and English) and investigated the relationship between self-confidence and mathematics performance. Using a descriptive-comparative and correlational research design, data were analyzed through frequency distribution, mean, one-way ANOVA, and Pearson's r correlation. Results revealed that students generally demonstrated a moderate level of mathematics performance, with most obtaining a "Good" rating; however, their overall mathematics self-confidence was found to be low, particularly in indicators related to perceived ability and problem-solving competence. Significant differences were observed in both performance and self-confidence across specializations, with BSE-Mathematics and BSE-Social Science students outperforming and exhibiting higher confidence than their counterparts in language-related programs. Despite low confidence levels, students showed positive affective dispositions toward mathematics, particularly in terms of enjoyment in solving problems. Correlational analysis further indicated a statistically significant positive relationship between mathematics self-confidence and academic performance, with affective factors demonstrating relatively stronger associations. It is recommended that future research may explore longitudinal designs to examine how mathematics self-confidence develops over time and across academic levels, as well as intervention-based studies aimed at strengthening both cognitive competence and affective engagement.

INTRODUCTION

Teachers play a vital role in ensuring the delivery of quality education, as they are primarily responsible for planning and facilitating meaningful learning experiences. In doing so, teachers must recognize that learning is not solely influenced by cognitive factors but is also significantly shaped by affective dimensions such as self-confidence. A learning environment that is free from fear and anxiety enables students to feel more capable and confident, thereby promoting deeper engagement and higher-quality learning outcomes. In mathematics education, this affective domain becomes particularly crucial, as students' level of mathematics self-confidence can directly influence their academic performance. Hence, examining the extent to which mathematics self-confidence affects students' performance is both timely and necessary, especially among future educators.

Mathematics remains a fundamental subject for first-year students taking the Bachelor of Secondary Education (BSE), as it develops essential skills such as logical reasoning, critical thinking, and problem-solving. One of the key courses they encounter is Mathematics in the Modern World (MMW), which is designed to highlight the practical applications of mathematics in daily life. Despite its intended accessibility, many students continue to exhibit low confidence when solving mathematical problems, which in turn affects their performance. As emphasized by Okta Fidyani et al. (2025), while mathematics education is crucial for developing higher-order thinking skills, enhancing students' creativity and self-confidence remains a significant challenge, particularly when dealing with complex problems.

Mathematics self-confidence plays a crucial role in shaping students' engagement with mathematical tasks. It influences their willingness to participate, persist in solving difficult problems, and explore multiple solution strategies. Conversely, students with low self-confidence often hesitate to engage, doubt their answers, and experience anxiety during problem-solving. This psychological barrier shifts their focus from understanding mathematical processes to avoiding mistakes, often resulting in incomplete, incorrect, or unanswered solutions. Over time, this pattern may lead to poor academic performance and the development of negative attitudes toward mathematics. For BSE students, particularly those who will become future mathematics educators, this issue is of greater concern, as their level of confidence can influence not only their academic success but also their future teaching practices. Supporting this, Kharisudin (2022) found that students with high self-confidence are better able to establish connections between mathematical concepts and employ diverse and creative problem-solving strategies, indicating a strong link between self-confidence and creative thinking achievement.

Further supporting this relationship, Setiawan, H. et al. (2022) revealed that students with higher self-confidence demonstrate better mathematical comprehension and are more decisive when approaching problem-solving tasks. These students are capable of generating multiple strategies, leading to deeper conceptual understanding. In contrast, students with low self-confidence tend to rely on rote memorization and struggle when confronted with unfamiliar or complex problems. Similarly, Putra, F. et al. (2025) reported that students with higher self-confidence perform better in representing mathematical ideas, actively engage in

problem-solving, and articulate their reasoning more clearly. These findings collectively highlight that self-confidence is not only linked to motivation and participation but also significantly influences students' mathematical thinking and performance. Consequently, teachers are encouraged to implement instructional strategies that foster confidence, allowing students to explore, make mistakes, and grow within a supportive learning environment.

In the same vein, Vergara (2024) found that university students generally exhibit moderate levels of self-esteem and self-efficacy, alongside average mathematics performance, with higher levels of these affective traits associated with better outcomes. Moneva, Valle, and Desabille (2020) further explained that self-confidence is rooted in one's belief in their abilities and can be developed through consistent support and encouragement. As a learned trait, self-confidence can be strengthened through positive reinforcement and guided practice, ultimately enhancing students' performance in mathematics.

On a broader scale, a meta-analysis conducted by Çiftçi and Yildiz (2019), which included 336 datasets from 76 countries and over one million students from the Trends in International Mathematics and Science Study (TIMSS), revealed a moderate positive relationship between self-confidence and mathematics achievement. The study also identified moderating factors such as national culture, economic development, and educational context, suggesting that as countries progress, individual factors like self-confidence become increasingly influential in determining academic success. However, despite this global evidence, challenges persist. For instance, Dewanti et al. (2025) reported that students in Indonesia continue to struggle with low mathematics self-confidence, which adversely affects their academic performance. This indicates that the issue of low self-confidence in mathematics is not isolated but is a widespread concern across different educational contexts.

Despite demonstrating confidence in other academic areas, many first-year students still experience anxiety and self-doubt when dealing with mathematical tasks. This raises important questions regarding how mathematical self-confidence influences their academic performance and what interventions can effectively enhance this attribute. Identifying strategies to improve students' confidence is essential in helping them succeed not only in mathematics but also in their overall academic journey.

Although numerous studies have explored the relationship between self-confidence and mathematics performance, there remains a limited body of research specifically focusing on mathematics self-confidence among first-year BSE students, particularly within the context of Isabela State University. As future educators, these students are expected not only to master mathematical concepts but also to teach them effectively. Their level of mathematics self-confidence may significantly influence both their academic outcomes and their future instructional practices. Therefore, it is imperative to investigate this relationship at the early stage of their professional preparation.

Anchored on these premises, the primary purpose of this study is to examine the relationship between mathematics self-confidence and mathematics performance among first-year BSE students at ISU Main Campus. The findings of this study are expected to provide valuable insights into how self-confidence influences students' problem-solving approaches

and academic achievement. Ultimately, this may guide educators in designing targeted interventions and instructional strategies that foster confidence and improve students' performance in mathematics.

METHODS

Research Design

The study employed a quantitative method, specifically the descriptive-correlational method. A descriptive method was used to present the profiles of the respondents based on their course, level of mathematics self-confidence, and mathematics performance. Additionally, a correlational method was used to determine the relationship between mathematics self-confidence and performance.

Respondents and Locale of the Study

This study was conducted in San Fabian, Echague, Isabela, specifically in Isabela State University - Main Campus. The respondents of the study were the first-year Bachelor of Secondary Education (BSE) students enrolled during the Second Semester of SY 2025-2026. A sample size of 118 was determined using Cochran's Formula for a finite population with a 95% confidence level and a 5% margin of error. Respondents were selected through stratified sampling to ensure proportional representation.

Research Instrument

An adopted questionnaire from the study of Asp, Lena (2019), titled "Construct Validity of Mixed-Worded Mathematics Confidence Scale: Relations with Mathematics Achievement in TIMSS 2019," was utilized to assess the respondents' level of mathematics confidence. The instrument consists of nine items measured on a four-point Likert scale: 1 – Strongly Disagree, 2 – Disagree, 3 – Agree, and 4 – Strongly Agree.

Data Gathering Procedure and Analysis

The research instrument underwent pilot testing before the actual survey was conducted. Pilot testing was conducted among Bachelor of Early Childhood Education students to test and ensure the internal consistency of the questionnaire.

After finalizing the instrument, the questionnaires were distributed face-to-face, and the respondents were given enough time to complete and return them. The data gathering process took approximately one week to finish.

After collecting the questionnaires, the responses were encoded in Microsoft Excel and analyzed using Jamovi. Descriptive statistics, such as frequency and percentage, were used to summarize the respondents' profile, while the mean was used to determine the average level of their mathematics self-confidence. In addition, the Pearson product-moment correlation coefficient was used to examine the relationship between mathematics self-confidence and performance.

In measuring respondents' level of mathematics self-confidence, the following scale is utilized to interpret their responses effectively.

Table 1. Scale Used for the Level of Mathematics Self- Confidence

Range of Point	Descriptive Interpretation
3.25 – 4.00	Very High Confidence
2.50 – 3.24	High Confidence
1.75 – 2.49	Low Confidence
1.00 – 1.74	Very Low Confidence

Furthermore, one-way ANOVA was employed to examine the differences in mathematics performance and mathematics self-confidence across the profiles of the respondents.

RESULTS AND DISCUSSION

Profile of the Respondents

Table 2. Profile of Respondents in Terms of Specialization

Profile	Frequency (n=118)	Percentage (100%)
BSE Mathematics	28	23.73%
BSE Social Science	28	23.73%
BSE English	28	23.73%
BSE Filipino	34	28.81%

The table presents the distribution of respondents according to their specialization. Based on the data, the majority of the respondents were from the BSE-Filipino program. Meanwhile, the remaining three specializations—Mathematics, Social Science, and English—had equal percentages of representation.

Mathematics Performance of the Respondents

Table 3. Mathematics Performance of the Respondents

Performance Description	Frequency (n=118)	Percentage (100%)
Excellent (1.00)	0	0%
Very Satisfactory (1.25)	1	0.85%
Satisfactory (1.50)	6	5.08%
Fairly Satisfactory (1.75)	13	11.02%
Good (2.00)	32	27.12%
Fairly Good (2.25)	26	22.03%
Fair (2.50)	19	16.10%
Below Fair (2.75)	20	16.95%
Passed (3.0)	1	0.85%

Table 3 presents the mathematics performance of the respondents, based on their grades in Mathematics in the Modern World, a General Education Course (GEC) in mathematics. The table reveals a generally moderate level of achievement among the respondents. Notably, the majority of the respondents obtained a grade of 2.00, described as "Good," followed by those who fall within the "Fairly Good" performance category. The results further revealed that while most respondents are clustered within the average level of performance, only one attained a "Very Satisfactory" rating. Interestingly, only one respondent received the lowest passing mark of 3.00.

Level of Mathematics Self-Confidence

Table 4 presents the level of mathematics self-confidence of the respondents. On average, the First-Year BSE students show a low level of mathematics confidence. This implies that the respondents generally perceive themselves as lacking confidence in their mathematical abilities, which may adversely affect their engagement and performance in mathematics-related tasks.

Table 4. Level of students Mathematics Self-Confidence

Mathematics Self-Confidence Statements	Mean	Interpretation
1. I usually do well in mathematics	2.49	Low Confidence
2. Mathematics is easier for me than for many of my classmates	2.09	Low Confidence
3. I am good at mathematics	2.36	Low Confidence
4. I learn things quickly in mathematics	2.44	Low Confidence
5. It makes me happy when I find the solution in mathematical problems	3.14	High Confidence
6. I am good at working out difficult mathematics	2.29	Low Confidence
7. My teachers tell me I am good at mathematics	2.03	Low Confidence
8. Mathematics is easier for me than any other subjects.	2.12	Low Confidence
9. Mathematics enables me to think creatively solving mathematics	2.63	High Confidence
Grand Mean	**2.40**	**Low Confidence**

A closer examination of the individual indicators reveals that most items fall within the "Low Confidence" category, particularly those related to self-perception of ability, such as doing well in mathematics, being good at mathematics, and solving difficult mathematical problems. Notably, the lowest mean score (2.03) was recorded for the statement "My teachers tell me I am good at mathematics," which suggests that external validation and reinforcement from teachers may be limited or not strongly perceived by the students. This lack of affirmation could contribute to the development of low self-confidence, as students often rely on feedback from authority figures to shape their academic self-concept.

Interestingly, while the results revealed that the respondents may lack confidence in their mathematical abilities, they still recognize the intrinsic value and satisfaction derived from engaging in mathematical problem-solving. This indicates the presence of a positive disposition toward mathematics, which can serve as a foundation for improving their confidence.

Difference in Mathematics Performance of the Respondents in terms of Specialization

Table 5. Difference between Students' Mathematics Performance when grouped according to their Course

Variable	Group Means				F-value	p-value
	BSE- Math (a)	BSE-Filipino (b)	BSE-Social Science (c)	BSE-English (d)		
Mathematics Performance	1.93^{bd}	2.35^{ac}	2.13^{bd}	2.40^{ac}	13.4	<.001

A one-way ANOVA was conducted to compare the mathematics performance of the respondents across fields of specialization. The results indicate a significant difference in the mean performance among the groups. Post-hoc analysis further revealed that the mathematics performance of the students in the Mathematics and Social Science specializations is significantly higher than that of those in the Languages specialization.

Difference in Mathematics Self-Confidence of the Respondents in terms of Specialization

Table 6. Difference between Students' Mathematics Self-Confidence when group according to their Course

Variable	Group Means				F-value	p-value
	BSE-Math (a)	BSE-Filipino (b)	BSE-Social Science (c)	BSE-English (d)		
1. I usually do well in mathematics	2.75^{d}	2.59^{d}	2.61^{d}	2.00^{abc}	11.97	<.001
2. Mathematics is easier for me than for many of my classmates	2.39^{d}	2.12	2.04	1.82^{a}	3.64	0.017
3. I am good at mathematics	2.82^{bcd}	2.35^{ad}	2.32^{a}	1.93^{ab}	14.36	<.001
4. I learn things quickly in mathematics	2.86^{bcd}	2.35^{ad}	2.57^{a}	2.00^{ba}	10.15	<.001
5. It makes me happy when I find the solution in mathematical problems	3.29^{bd}	3.00^{a}	3.50^{d}	2.82^{ac}	6.45	<.001

6. I am good at working out difficult mathematics	2.75[bcd]	2.29[a]	2.25[a]	1.86[a]	10.57	<.001
7. My teachers tell me I am good at mathematics	2.29[d]	2.12	1.96	1.75[a]	4.93	0.004
8. Mathematics is easier for me than any other subjects.	2.79[bcd]	1.97[a]	2.07[a]	1.68[a]	13.39	<.001
9. Mathematics enables me to think creatively solving mathematics	2.96[d]	2.47	2.75	2.36[d]	4.57	0.006

Table 6 revealed that the mathematics self-confidence of the respondents significantly differs across the four fields of specialization. Based on the post-hoc result, self-confidence in mathematics is not uniformly distributed across disciplines.

Students enrolled in BSE-Mathematics consistently demonstrate higher levels of self-confidence across most indicators, particularly in items related to perceived competence (e.g., "I am good at mathematics," "I learn things quickly in mathematics," and "Mathematics enables me to think creatively"). These findings suggest that sustained exposure to mathematical content and specialized training strengthens both cognitive and affective dimensions of confidence. In contrast, BSE-English students tend to report the lowest mean scores across nearly all items, with significant differences observed when compared to BSE-Mathematics and, in several cases, BSE-Social Science. This pattern implies that students in language-oriented programs may have less engagement with or affinity toward mathematics, potentially influencing their self-perceptions.

Notably, BSE-Social Science students occasionally register comparable or even higher confidence levels than other groups, particularly in affective dimensions such as enjoyment (e.g., "It makes me happy when I find the solution in mathematical problems"), where they significantly differ from BSE-Filipino and BSE-English groups. Meanwhile, BSE-Filipino students generally occupy a middle range, though significant gaps still emerge in comparison with BSE-Mathematics and other groups in selected items.

The post-hoc results further reveal that differences are not always linear; some items show overlapping groupings, indicating partial similarities in self-confidence between certain disciplines. For instance, while BSE-Mathematics students outperform others in most cognitive-related items, their advantage is less pronounced in affective aspects, where BSE-Social Science students sometimes exhibit comparable or higher means. This suggests that mathematical self-confidence is multidimensional, influenced not only by content mastery but also by attitudes and emotional responses toward the subject.

Relationship between Mathematics Self-Confidence and Performance

Table 7 presents the relationship between students' mathematics self-confidence and their mathematics performance. The findings generally indicate a positive association between self-confidence in mathematics and performance outcomes.

Table 7. Relationship between Mathematics Self-Confidence and Performance

Mathematics Self-Confidence Statements	r- value	p- value
1. I usually do well in mathematics	0.287	0.002
2. Mathematics is easier for me than for many of my classmates	0.171	0.064
3. I am good at mathematics	0.262	0.004
4. I learn things quickly in mathematics	0.287	0.002
5. It makes me happy when I find the solution in mathematical problems	0.346	<0.001
6. I am good at working out difficult mathematics	0.239	0.009
7. My teachers tell me I am good at mathematics	0.132	0.156
8. Mathematics is easier for me than any other subjects	0.249	0.007
9. Mathematics enables me to think creatively solving mathematics	0.266	0.004

The results indicate a statistically significant positive relationship between mathematics self-confidence and academic performance, with most indicators yielding moderate correlation coefficients. Notably, affective dimensions such as enjoyment in problem-solving ($r = 0.346$, $p < .001$) demonstrate the strongest association, suggesting that emotional engagement plays a critical role in shaping academic outcomes. This finding is consistent with the findings of recent studies (Çiftçi S. and Yildiz, P., 2019; Putra, F. et al., 2025; Setiawan, H. et al., 2022; & Kharisudin, I., 2022), which corroborated that self-confidence is significantly linked to mathematics performance.

CONCLUSION AND FUTURE WORKS

The findings of this study collectively indicate that while first-year BSE students demonstrate generally moderate mathematics performance, their overall level of mathematics self-confidence remains low and varies significantly across fields of specialization. Students in mathematics-oriented programs exhibit higher confidence and performance, whereas those in language-related specializations tend to report lower levels. Despite low self-confidence, the presence of positive affective responses, particularly enjoyment in problem-solving, emerges as a crucial factor associated with better academic outcomes, which reinforces the role of intrinsic motivation in mathematics learning. Moreover, the significant positive relationship between self-confidence and performance underscores the importance of promoting students' beliefs in their mathematical capabilities as a means of enhancing achievement. In light of these findings, future research may explore longitudinal designs to examine how mathematics self-confidence develops over time and across academic levels, as well as intervention-based studies aimed at strengthening both cognitive competence and affective engagement, particularly among students in non-mathematics specializations. Additionally, further investigations may consider the role of instructional practices, teacher feedback, and learning environments in shaping students' mathematical self-concept and performance outcomes.

ACKNOWLEDGMENT

This study would not have been possible without the support, guidance, and encouragement of several notable individuals. The researchers would like to express their sincere appreciation to all those who contributed to its successful completion.

To Sir Randy P. Acoba, our Advanced Statistics adviser, whose guidance, unwavering support, and encouragement were instrumental in the completion of this research.

To the respondents, particularly the first-year Bachelor of Secondary Education (BSE) students of Isabela State University – Main Campus, for taking the time to provide the information necessary for this study.

To our parents, for their financial, moral, and spiritual support from the beginning of this study until its completion. Their encouragement and motivation inspired us to give our best throughout this journey.

To our friends, especially Rizel Andrea Dela Cruz, for keeping us motivated, uplifting our spirits during moments of exhaustion, and encouraging us to complete this study.

Above all, we give thanks to the Heavenly Father for His love, guidance, wisdom, and strength, which made the successful completion of this work possible.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper

DECLARATION OF AI USE

ChatGPT was used to assist with paraphrasing selected portions of the text to improve clarity and coherence, while Quillbot and Grammarly were used for grammar checking. These tools were applied only for language refinement purposes and did not contribute to the methods and interpretation of results. All intellectual content and final decisions remain the responsibility of the researchers.

REFERENCE

Asp, L. (2026). Construct validity of a mixed-worded mathematics confidence scale: Relations with mathematics achievement in TIMSS 2019. *Studies in Educational Evaluation*, *88*, 101562.

Çiftçi, S. K., & Yildiz, P. (2019). The Effect of Self-Confidence on Mathematics Achievement: The Metaanalysis of Trends in International Mathematics and Science Study (TIMSS). *International Journal of instruction*, *12*(2), 683-694.

Dewanti, S. S., Ashabulabib, A., Dewi, I. P., & Islamiyah, A. M. (2025). Development and Validation of A Self-Confidence Measurement Instrument In Mathematics Learning Using The Rasch Model. *Mathline: Jurnal Matematika dan Pendidikan Matematika*, *10*(1), 55-69.

Fidyani, O., Winarni, S., Marlina, M., Rohati, R., & Kumalasari, A. (2025). Creative Performance Self-Efficacy and Mathematical Problem-Solving: Analyzing Students' Strategies in Number Patterns. *Jurnal Pendidikan MIPA*, *26*(1), 429-456.

Kharisudin, I. (2022). Analysis of mathematical creative thinking skill: in terms of self confidence. *International Journal of Instruction*, *15*(4), 1011-1034.

Moneva, D. J., Valle, A. F. S., & Desabille, I. (2020). Difficulty in mathematics: Close assistance and self-confidence. *Journal of Studies in Education*, *10*(1), 117.

Putra, F. G., & Widyawati, S. (2025). Exploring the impact of self-confidence on students' mathematical representation skills. *Pasundan Journal of Mathematics Education: Jurnal Pendidikan Matematika*, *15*(1), 71-80.

Setiawan, H., Hendriana, H., Sabandar, J., & Fitriani, N. (2022). The effect of self confidence on the ability of Understanding mathematical concepts of junior high school students on the triangle and quarter matter. *Al Khawarizmi: Jurnal Pendidikan Dan Pembelajaran Matematika*, *6*(1), 13-24.

Vergara, C. R. (2024, November). Self-Esteem and Self-Efficacy as Predictors of Students' Achievement in Mathematics. In *4th International Conference on Education and Technology (ICETECH 2023)* (pp. 521-536). Atlantis Press.