Mathematical Resilience, Problem-Solving Confidence and Performance of College Students

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ABSTRACT

This study examined the levels and relationships among mathematical resilience, problem-solving confidence, and mathematics performance of college students. Using a quantitative descriptive-correlational design, the study involved 224 first-year undergraduate students enrolled in a local higher education institution in the Negros Island Region, Philippines, during the first semester of academic year 2025–2026. Data were collected through researcher-made instruments measuring mathematical resilience and problem-solving confidence, while mathematics performance was determined from students' final course grades in GE 4 – Mathematics in the Modern World course. Results revealed that students demonstrated high levels of mathematical resilience and problem-solving confidence, as well as good performance in mathematics. Mathematical resilience was not significantly related to mathematics performance, and problem-solving confidence likewise showed no significant relationship with mathematics performance. However, mathematical resilience and problem-solving confidence had a significant moderate positive relationship. The findings indicate that although resilience and confidence are associated with one another, neither variable independently corresponded with students' mathematics performance. The study underscores the need for instructional and student-support initiatives that strengthen resilience and problem-solving confidence while also addressing cognitive preparation, strategic competence, and other determinants of mathematics achievement.

Keywords: Mathematical Resilience; Problem-Solving Confidence; Mathematics Performance; College Students

INTRODUCTION

Mathematical resilience refers to a student's capacity to persist, maintain a positive disposition, and adapt adaptively when encountering mathematical obstacles, conceptual setbacks, or negative learning environments (Xenofontos & Mouroutsou, 2022). Students who possess high levels of mathematical resilience are equipped to view errors as constructive learning opportunities, actively seek appropriate assistance when necessary, and maintain task motivation despite localized failures (Ekayanti et al., 2023). Conversely, students with low mathematical resilience often exhibit heightened anxiety, strong avoidance behaviors, and a terminal decrease in internal motivation toward mathematical learning tasks (Liu, 2024). Empirical research confirms that resilient students are substantially better prepared to cope with standard academic setbacks and consequently demonstrate superior levels of conceptual mastery and final course achievement (Vergara, 2021).

Concurrently, problem-solving confidence plays an influential role in driving mathematics achievement. Problem-solving confidence pertains directly to an individual's explicit belief in their capability to understand, analyze, strategize, and solve mathematical problems successfully (Street et al., 2024). Students who are highly confident in their problem-solving capacities tend to engage more actively in classroom learning, employ sophisticated metacognitive and cognitive strategies, and demonstrate extended persistence when confronted with complex or multi-step mathematical tasks (Cano & Lomibao, 2023). In contrast, students who suffer from low self-confidence routinely doubt their mathematical capabilities, aggressively avoid challenging problem sets, and exhibit substantially poorer academic outcomes (Islami et al., 2022).

The combined interaction among mathematical resilience, problem-solving confidence, and mathematics achievement has gained increasing attention in mathematics education research globally (Zakariya, 2022). Studies strongly suggest that students who concurrently demonstrate high resilience and robust confidence are significantly more likely to achieve higher academic performance because these distinct attributes work in tandem to promote persistence, strategic thinking, and positive adaptive learning behaviors (Fernández-Cézar et al., 2021). Nevertheless, while numerous international studies have examined these psychological variables independently, limited local research has investigated their combined or synergistic influence on mathematics achievement among college students, particularly within the higher education context of the Philippines (Vergara, 2021).

Given the ongoing institutional concerns regarding students' foundational mathematics performance in general education courses, it is essential to explore how mathematical resilience and problem-solving confidence structurally relate to and predict academic achievement. The findings of this study aimed to provide educators, curriculum designers, and academic administrators with critical empirical data for crafting instructional interventions and student support programs that explicitly foster resilience and confidence among tertiary students, ultimately enhancing institutional mathematics achievement.

METHODOLOGY

This study employed a quantitative, descriptive-correlational research design to examine the relationships among mathematical resilience, problem-solving confidence, and mathematics performance among undergraduate freshmen. The study population consisted of 508 officially enrolled first-year undergraduate students taking GE 4 – Mathematics in the Modern World during Academic Year 2025–2026 at a local higher education institution in Negros Island Region. The required sample size was determined using Yamane's formula, resulting in a sample of 224 respondents. To ensure adequate representation of students from the identified population, stratified random sampling was employed. The population was first divided into appropriate strata based on the students' respective class or section groupings, after which respondents were proportionately allocated to each stratum. Respondents within each stratum were then selected through random sampling. This procedure provided each eligible student with a known opportunity for selection while ensuring that the different strata within the population were adequately represented in the final sample. Only officially enrolled students who met the study's eligibility requirements and voluntarily agreed to participate were included in the study.

Data were collected using a researcher-made, three-part questionnaire. Part I consisted of a 25-item Mathematical Resilience Scale based on the Mathematical Resilience framework of Johnston-Wilder and colleagues, covering value of mathematics, perseverance in learning mathematics, growth mindset toward mathematics, managing mathematical anxiety, and seeking support when facing difficulties. Part II comprised a 20-item Problem-Solving Confidence Scale measuring confidence in understanding mathematical problems, applying mathematical strategies, monitoring and evaluating solutions, and solving challenging problems. Both scales employed a five-point Likert scale. Part III obtained students' mathematics performance from their official final numerical grades in GE 4 – Mathematics in the Modern World.

Prior to administration, the instrument underwent content validation by five educational experts, with Lawshe's Content Validity Ratio yielding a value of 1.00 for both major variables. A pilot test involving 30 comparable college students was subsequently conducted to establish internal consistency. The Mathematical Resilience Scale obtained a Cronbach's alpha of 0.969, the Problem-Solving Confidence Scale obtained 0.923, and the overall instrument demonstrated excellent reliability ($\alpha = 0.985$).

Following institutional authorization and the completion of the required validation procedures, the questionnaires were administered to the selected respondents. Participation was conducted in accordance with appropriate research and ethical procedures, with the collected information treated confidentially and used solely for academic purposes. Completed questionnaires were checked, coded, organized, and prepared for statistical analysis.

The mean and standard deviation were used to describe the levels of mathematical resilience, problem-solving confidence, and mathematics performance. The Spearman rank-order correlation coefficient (rs) was employed

to determine the direction, strength, and statistical significance of the relationships among the study variables. This nonparametric procedure was used to assess the associations between mathematical resilience and mathematics performance, problem-solving confidence and mathematics performance, and mathematical resilience and problem-solving confidence.

RESULTS AND DISCUSSIONS

Level of Mathematical Resilience Among College Students

Table 1. Level of Mathematical Resilience Among College Students as a Whole and in Terms of Value of Mathematics, Perseverance in Learning Mathematics, Growth Mindset Toward Mathematics, Managing Mathematical Anxiety, and Seeking Support When Facing Difficulties.

Statements	Mean	SD	Interpretation
As a Whole	**3.94**	**0.64**	**High**
Value of Mathematics	**4.23**	**0.72**	**Very High**
1. Mathematics is important in my future career.	4.14	0.85	High
2. Learning mathematics helps me develop logical thinking.	4.21	0.82	Very High
3. I find mathematics useful in everyday life.	4.37	0.81	Very High
4. Mathematics is worth the effort required to learn it.	4.19	0.78	High
5. I believe mathematics is an essential subject.	4.22	0.81	Very High
Perseverance in Learning Mathematics	**3.79**	**0.80**	**High**
6. I continue working even when mathematics problems are difficult.	3.87	0.90	High
7. I do not easily give up when solving mathematical tasks.	3.71	0.85	High
8. I try different strategies when my first solution fails.	3.80	0.81	High
9. I remain motivated despite mistakes in mathematics.	3.78	1.00	High
10. Difficult mathematics problems encourage me to work harder.	3.77	0.95	High
Growth Mindset Toward Mathematics	**4.08**	**0.75**	**High**
11. My mathematical ability can improve through practice.	4.11	0.81	High
12. Mistakes help me learn mathematics better.	4.07	0.87	High
13. I believe effort leads to improvement in mathematics.	4.24	0.81	Very High
14. Challenging tasks help me develop mathematical skills.	3.99	0.83	High
15. I can become better in mathematics through persistence.	3.97	0.86	High
Managing Mathematical Anxiety	**3.60**	**0.83**	**High**
16. I remain calm when solving difficult mathematics problems.	3.63	0.94	High
17. I can manage my nervousness during mathematics examinations.	3.52	0.93	High
18. I stay focused even when mathematics tasks are challenging.	3.61	0.94	High
19. I stay focused even when mathematics tasks are challenging.	3.65	0.91	High
20. I remain confident despite making mistakes.	3.62	0.91	High
Seeking Support	**4.03**	**0.66**	**High**
21. I ask for help when I encounter difficult mathematics concepts.	4.27	0.78	Very High

22. I participate in discussions to improve my mathematical understanding.	3.96	0.81	High
23. I consult teachers when I need assistance in mathematics.	3.91	0.85	High
24. I learn from classmates when solving mathematics problems.	3.96	0.88	High
25. I use available resources to overcome mathematics difficulties.	4.05	0.77	High

Legend: (4.21-5.00)-Very High; (3.41-4.20)-High; (2.61-3.40)-Moderate; (1.81-2.60))-Low; (1.00-1.80)-Very Low

The findings indicate that the respondents demonstrated a high level of mathematical resilience, with an overall mean of 3.94 (SD = 0.64). This suggests that the students' mathematical resilience and psychological attributes are regularly evident, effectively supporting learning behaviors. The relatively small variation in responses indicates that the respondents generally shared similar perceptions of their ability to cope with mathematical challenges, sustain effort, and remain engaged in learning despite difficulties.

Among the dimensions, value of mathematics obtained the highest mean (M = 4.23, SD = 0.72), interpreted as very high. This result indicates that the respondents strongly recognized mathematics as relevant to their future careers, logical reasoning, everyday life, and academic development. The relatively low variation in responses indicates that these perceptions were generally shared across the respondents. In particular, the highest-rated statement was the perceived usefulness of mathematics in everyday life (M = 4.37, SD = 0.81), suggesting that students viewed mathematics as practical and meaningful beyond classroom requirements. This finding is consistent with Wang et al. (2022), who found that autonomous motivation and perceived competence were important predictors of college students' mathematics achievement. When students recognize the value of mathematics, they are more likely to engage purposefully in mathematical learning tasks.

The respondents also reported a high level of growth mindset toward mathematics (M = 4.08, SD = 0.75) and seeking support when facing difficulties (M = 4.03, SD = 0.66). These findings imply that students generally believed their mathematical competence could improve through effort, practice, and persistence, while also demonstrating willingness to seek assistance from teachers, classmates, and other learning resources. The statement "I believe effort leads to improvement in mathematics" received a very high rating (M = 4.24, SD = 0.81), reinforcing the students' adaptive beliefs regarding the malleability of mathematical ability. Similarly, asking for help when encountering difficult mathematical concepts received a very high rating (M = 4.27, SD = 0.78), indicating that help-seeking was a prominent resilience strategy. These results support the systematic review of Constantinos Xenofontos and Stella Mouroutsou (2022), which identified mathematical resilience as closely associated with students' mathematical identity, positive beliefs, and access to supportive learning conditions.

Furthermore, perseverance in learning mathematics was rated high (M = 3.79, SD = 0.80), indicating that the students generally persisted when mathematical tasks became demanding and attempted alternative strategies when initial solutions were unsuccessful. This suggests that the respondents were capable of engaging in productive struggle rather than immediately withdrawing from challenging tasks. This result aligns with the findings of DiNapoli and Miller (2022), who emphasized that perseverance in mathematical problem-solving can be strengthened through instructional scaffolds that support conceptual thinking and sustained engagement with difficult tasks.

Although still interpreted as high, managing mathematical anxiety obtained the lowest mean among the dimensions (M = 3.60, SD = 0.83). This indicates that students were generally able to remain calm, focused, and confident during challenging mathematical tasks; however, the comparatively lower mean suggests that anxiety management remains an area requiring continued instructional and psychosocial support. The lowest-rated statement concerned managing nervousness during mathematics examinations (M = 3.52, SD = 0.93), which may indicate that evaluative situations present greater emotional difficulty for some students. This finding is supported by Khasawneh et al. (2021), who explained that mathematics anxiety may interfere with students' ability to perform mathematical tasks and solve problems effectively in academic contexts.

Overall, the results indicate that college students possessed favorable levels of mathematical resilience, particularly in recognizing the value of mathematics, maintaining a growth-oriented perspective, and seeking support during difficulties. Nevertheless, interventions that strengthen emotional regulation and confidence during mathematics examinations may further enhance students' capacity to respond constructively to mathematical challenges.

Level of Problem-Solving Confidence Among College Students

Table 2. Level of Problem-Solving Confidence Among College Students as a Whole and in Terms of Understanding Mathematical Problems, Applying Mathematical Strategies, Monitoring and Evaluating Solutions, and Confidence in Solving Challenging Problems.

Statements	Mean	SD	Interpretation
As a Whole	**3.53**	**0.68**	**High**
Understanding Mathematical Problems	**3.61**	**0.65**	**High**
1. I can identify what is being asked in a mathematics problem.	3.66	0.76	High
2. I can understand complex mathematical instructions.	3.52	0.79	High
3. I can determine relevant information needed to solve a problem.	3.72	0.73	High
4. I feel confident interpreting mathematical situations.	3.50	0.82	High
5. I understand mathematical symbols and representations.	3.64	0.74	High
Applying Mathematical Strategies	**3.46**	**0.77**	**High**
6. I know which mathematical strategy to use when solving problems.	3.56	0.80	High
7. I can apply formulas correctly.	3.47	0.85	High
8. I can select appropriate procedures for solving problems.	3.56	0.82	High
9. I can solve unfamiliar mathematical tasks.	3.23	0.93	Moderate
10. I can use multiple methods when solving mathematics problems.	3.46	0.90	High
Monitoring and Evaluating Solutions	**3.69**	**0.74**	**High**
11. I can check whether my answer is reasonable.	3.67	0.83	High
12. I review my work before submitting it.	4.00	0.97	High
13. I can identify errors in my solutions.	3.55	0.83	High
14. I can explain how I arrived at an answer.	3.59	0.91	High
15. I evaluate the effectiveness of my problem-solving strategies.	3.66	0.79	High
Confidence in Solving Challenging Problems	**3.36**	**0.83**	**Moderate**
16. I feel confident solving difficult mathematics problems.	3.36	0.92	Moderate
17. I can solve mathematics problems under pressure.	3.22	0.94	Moderate
18. I trust my ability to find correct solutions.	3.55	0.86	High
19. I trust my ability to find correct solutions.	3.24	0.93	Moderate
20. I remain confident even when problems become complex.	3.42	0.91	High

Legend: (4.21-5.00)-Very High; (3.41-4.20)-High; (2.61-3.40)-Moderate; (1.81-2.60))-Low; (1.00-1.80)-Very Low

Overall, the respondents demonstrated a high level of problem-solving confidence (M = 3.53, SD = 0.68), indicating that they were generally operationally capable of understanding mathematical problems, selecting and applying procedures, and monitoring their solutions with minimal hesitation. The relatively small variation in responses indicates that the respondents generally held similar perceptions of their problem-solving capabilities, although differences were evident across the specific dimensions. Recent evidence by Zakariya (2022) indicated

that interventions emphasizing mastery experiences, effective learning strategies, and supportive instructional practices can strengthen mathematics self-efficacy and related academic outcomes.

Among the domains, monitoring and evaluating solutions obtained the highest mean score (M = 3.69, SD = 0.74), interpreted as high. In particular, students reported that they reviewed their work before submission (M = 4.00, SD = 0.97), reflecting a strong tendency toward verification and self-regulation. They also expressed confidence in checking the reasonableness of answers (M = 3.67, SD = 0.83) and evaluating the effectiveness of their strategies (M = 3.66, SD = 0.79). These results imply that students were generally aware of the importance of reflective processes in mathematical problem solving. This pattern is consistent with the study of Samutkhet and Thipchart (2022), which reported that metacognition and mathematics self-efficacy were significantly associated with mathematical problem-solving ability. Likewise, Zakariya (2022) emphasized that self-efficacy-enhancing learning strategies, including reflective and self-regulatory practices, contribute meaningfully to students' success in mathematics.

Students also demonstrated a high level of confidence in understanding mathematical problems (M = 3.61, SD = 0.65). The highest-rated indicator in this domain was the ability to determine relevant information needed to solve a problem (M = 3.72, SD = 0.73), followed by identifying what a mathematics problem requires (M = 3.66, SD = 0.76). These findings indicate that respondents were generally confident in interpreting mathematical situations and recognizing the information necessary for solution development. Such confidence is important because comprehension of the problem is foundational to selecting appropriate strategies and producing accurate solutions. Chan et al. (2022) similarly found that university students distinguish between confidence in understanding mathematical reasoning and confidence in completing mathematics-related tasks, underscoring the importance of conceptual understanding in mathematics self-efficacy.

The domain of applying mathematical strategies was likewise rated high (M = 3.46, SD = 0.77). Students expressed confidence in selecting appropriate procedures (M = 3.56, SD = 0.82) and identifying suitable strategies (M = 3.56, SD = 0.80). However, confidence in solving unfamiliar mathematical tasks was only moderate (M = 3.23, SD = 0.93), suggesting that students may experience uncertainty when confronted with novel or nonroutine problems. This finding aligns with Handayani et al. (2022), who noted that insufficient confidence may hinder students' ability to select and apply strategies effectively when solving mathematical problems.

Finally, confidence in solving challenging problems registered a moderate level (M = 3.36, SD = 0.83), representing the lowest among the dimensions. Students reported moderate confidence in solving difficult mathematics problems (M = 3.36, SD = 0.92) and solving problems under pressure (M = 3.22, SD = 0.94). Although they showed high confidence in remaining composed as problems became complex (M = 3.42, SD = 0.91), the overall result indicates that challenging and time-pressured tasks may weaken their perceived capability. This suggests a need for instructional activities that progressively expose students to nonroutine problems, encourage productive persistence, and provide guided feedback to strengthen confidence in demanding mathematical situations. This finding points to the need for instructional activities that gradually increase task complexity, normalize productive struggle, and provide timely feedback, as these practices may help strengthen students' mathematics self-efficacy and persistence (Zakariya, 2022).

Level of Performance in Mathematics of the College Students

Table 3. Level of Performance in Mathematics of College Students.

Level of Performance in Mathematics	f	Mean	SD	Interpretation
Excellent	2	1.91	0.31	Good
Very Good	34			
Good	131			
Passed	56			
Barely Passed	1			

Failed	0			
Total	224			

Legend: (1.00)-Excellent; (1.25-1.5)-Very Good; (1.75-2.0)-Good; (2.25-2.5-Passed); (2.75-3.0)-Barely Passed; (5.0)-Failed

The mathematics performance of 224 college students revealed an overall mean score of 1.91 (SD = 0.31), indicating good academic performance. This suggests that the respondents demonstrated solid core competence in mathematics, with a generally adequate understanding of standard mathematical procedures and the ability to solve routine problems independently. The small variation in performance indicates that the students' grades were closely clustered around the overall mean, suggesting a relatively consistent level of achievement across the group.

The distribution of performance categories reinforces this result. Most students were classified as good (f = 131), followed by those who passed (f = 56) and those rated very good (f = 34). Only two students attained an excellent rating, one student was classified as barely passed, and none failed. Collectively, these findings indicate that the respondents generally met the expected learning outcomes in mathematics and that severe academic difficulty was uncommon within the sample. The predominance of students in the good category reflects adequate conceptual understanding, procedural competence, and engagement with mathematics-related coursework.

This finding is consistent with recent research showing that mathematics achievement is strengthened by students' self-efficacy, strategic learning behaviors, and persistence when confronting academic demands. Zakariya (2022) found that interventions designed to enhance mathematics self-efficacy can improve students' confidence and achievement-related outcomes. Similarly, Kong et al. (2022) reported that mathematics self-efficacy was positively associated with academic achievement, particularly when students employed effective learning strategies. In addition, Skaalvik and Skaalvik (2021) emphasized that perceived competence and adaptive motivational beliefs contribute to sustained academic engagement and performance. Thus, the generally good mathematics performance of the respondents may be associated with their capacity to regulate learning, apply appropriate strategies, and maintain confidence while completing mathematical tasks.

Relationship Between Mathematical Resilience and Performance in Mathematics

Table 4. Relationship Between Mathematical Resilience and Performance in Mathematics of Students.

Variable	Test Statistics (r_s)	p-value	Decision for Ho	Interpretation
Mathematical Resilience vs. Performance in Mathematics	-0.019	0.776	Failed to Reject Ho	Not Significant

Utilizing the Spearman rho, the results indicate that mathematical resilience was not significantly related with students' performance in mathematics ($r_s = -.019$, $p = .776$). Accordingly, the null hypothesis was failed to be rejected. The negligible negative coefficient suggests that students' capacity to persist through mathematical difficulties, recover from setbacks, and maintain constructive attitudes toward learning mathematics did not correspond to differences in their mathematics performance in the present sample. This finding implies that achievement in mathematics may be more immediately influenced by other academic and contextual factors, such as prior knowledge, study practices, instructional quality, assessment demands, and problem-solving confidence. Although mathematical resilience is theoretically valuable for sustaining engagement during challenging learning experiences, its direct relationship with performance may vary across learner populations and educational settings.

This result is consistent with the recent study of Terano (2026), which found a negative relationship between mathematical resilience and mathematics performance among engineering students, suggesting that resilience does not invariably translate into higher achievement. In contrast, studies on related motivational constructs have reported positive associations with mathematics achievement. For example, Salvan and Frias (2021) found that mathematics self-efficacy significantly and positively influenced college students' mathematics performance. Similarly, Zakariya (2022) concluded that mathematics self-efficacy is an important contributor to mathematical

success, underscoring the possibility that confidence in one's specific mathematical capabilities may be more proximally related to performance than resilience alone.

Relationship Between Problem-Solving Confidence and Performance in Mathematics

Table 5. Relationship Between Problem-Solving Confidence and Performance in Mathematics of Students.

Variable	Test Statistics (r_s)	p-value	Decision for Ho	Interpretation
Problem-Solving Confidence vs.Performance in Mathematics	0.011	0.872	Failed to Reject Ho	Not Significant

In Table 5, the Spearman rank-order correlation revealed that problem-solving confidence has no significant relationship with the performance of students in mathematics (rs = .011, p = .872). Therefore, the null hypothesis was failed to be rejected, suggesting that confidence in problem-solving does not influence the mathematics achievement of students. The result indicates that variations in students perceived confidence in solving mathematical problems were not associated with corresponding variations in their mathematics performance. Although problem-solving confidence may encourage persistence and willingness to engage with challenging tasks, confidence alone may not directly yield higher achievement when students differ in foundational knowledge, strategic competence, study habits, and exposure to mathematical tasks. Thus, mathematics performance in the present study may be shaped more strongly by cognitive and instructional factors than by students' self-perceived problem-solving confidence.

The finding differs from prior evidence indicating that mathematics-related self-efficacy can positively predict achievement. For instance, Salvan and Frias (2021) reported that self-efficacy had a significant positive effect on college students' mathematics performance. Likewise, Zakariya (2021) found evidence of a causal relationship between undergraduate students' mathematics self-efficacy and subsequent mathematics performance. The discrepancy may reflect the distinction between general problem-solving confidence and confidence that is specifically anchored to the mathematical content and assessment tasks used in the study. Dagdag et al. (2021) further showed that sources of mathematics problem-solving efficacy were associated with mathematics achievement among prospective teachers, suggesting that confidence may be more consequential when reinforced by mastery experiences, feedback, and task-specific competence.

Taken together, the nonsignificant relationships between mathematical resilience, problem-solving confidence, and mathematics performance indicate that these psychological variables, considered independently, do not adequately explain differences in students' mathematics achievement in the present sample. Although resilience and confidence may support persistence, engagement, and willingness to confront mathematical difficulties, their presence does not necessarily translate into higher academic performance. Achievement may instead reflect the combined influence of prior mathematical knowledge, strategic competence, study practices, instructional conditions, assessment demands, and opportunities for meaningful mathematical practice. Thus, the findings should not be interpreted as evidence that resilience and confidence are unimportant; rather, they suggest that their contribution to mathematics achievement may be conditional upon cognitive, instructional, and contextual factors.

Relationship Between Mathematical Resilience and Problem-Solving Confidence

Table 6. Relationship Between Mathematical Resilience and Problem-Solving Confidence of Students.

Variable	Test Statistics (r_s)	p-value	Decision for Ho	Interpretation
Mathematical Resilience vs. Problem-Solving Confidence	0.514	<0.001	Reject Ho	Significant

Table 6 shows a statistically significant, moderate positive relationship between mathematical resilience and problem-solving confidence among the students (rs = .514, p < .001). Hence, the null hypothesis was rejected. This finding indicates that students who demonstrated greater perseverance, adaptability, and constructive responses to mathematical difficulty also tended to report higher confidence in solving mathematical problems.

The magnitude of the association suggests that mathematical resilience is meaningfully linked with students perceived capability to engage with, persist in, and resolve challenging mathematical tasks. Nevertheless, the correlation does not establish causality; rather, it indicates that these constructs tend to develop concurrently within the present sample.

The result is supported by Bron (2022), who found that mathematical resilience was positively associated with mathematics self-efficacy among preservice teachers. Similarly, Cahyaningsih et al. (2021) identified mathematical resilience as an important factor related to students' mathematical problem-solving ability, emphasizing the role of persistence and positive responses to difficulty in problem-solving processes. Zakariya (2022) likewise concluded that mathematics self-efficacy is strengthened through instructional experiences that promote mastery, strategic engagement, and constructive feedback, conditions that may also foster resilience in mathematical learning.

CONCLUSIONS

Based on the observed findings gained in this study, the following conclusions are formulated:

College students exhibited a high level of mathematical resilience, reflecting a strong appreciation of mathematics, a growth-oriented view of learning, persistence in addressing difficulties, and willingness to seek support.

Students demonstrated high overall problem-solving confidence, particularly in understanding problems and evaluating the appropriateness of their solutions. Nevertheless, their comparatively lower confidence in solving challenging problems suggests that instruction should provide sustained exposure to nonroutine and complex tasks to enhance their capacity to work effectively under mathematical difficulty.

The students attained generally good mathematics performance, with most demonstrating good achievement but relatively few reaching the highest performance categories.

Mathematical resilience was not significantly associated with mathematics performance in the present sample, indicating that resilience alone does not adequately account for differences in students' mathematics achievement.

Similarly, problem-solving confidence was not significantly associated with mathematics performance, suggesting that perceived confidence alone may not translate into higher achievement without adequate mathematical knowledge, effective strategy use, and relevant learning opportunities. These findings should be interpreted cautiously, as mathematics achievement is likely shaped by multiple cognitive, instructional, behavioral, and contextual factors.

Accordingly, resilience and problem-solving confidence may be viewed as potentially supportive learner characteristics rather than sufficient standalone explanations of mathematics performance. Students who demonstrate stronger adaptive responses to mathematical challenges are more likely to feel capable of solving problems, that foster resilience strengthening confidence in mathematical problem solving.

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