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RESILIENCE TOWARDS MATHEMATICS AND ADJUSTMENTS TO COLLEGE AMONG FRESHMEN STUDENTS: A BASIS FOR AN INTERVENTION PROGRAM

Jaser Andrada Barcelona and Marianne Jane Antoinette D. Pua
Isabela State University

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Abstract

This study examined the relationship between resilience towards mathematics and college adjustment among 187 freshmen students in the Philippines. Employing a quantitative descriptive-correlational design with proportionate stratified random sampling, data were gathered using the revised Student Adaptation to College Questionnaire (SACQ; Baker & Siryk, 1989; Yaranay et al., 2021) and the Resilience Towards Mathematics Questionnaire (Atahan & Mert Uyangör, 2024).

Findings showed high levels of agreement in resilience towards mathematics, particularly in the Value and Growth dimensions. Participants demonstrated favorable academic, social, and institutional adjustment, but experienced moderate personal-emotional adjustment. Significant differences were observed in personal-emotional adjustment by sex, in the Growth dimension across senior high school strands, and in Struggle, Growth, and personal-emotional adjustment across academic programs. All dimensions of resilience towards mathematics were significantly and positively correlated with all dimensions of college adjustment.

The results indicate that resilience towards mathematics serves as a protective psychological resource that supports holistic college adjustment during the critical first-year transition. To address identified challenges, particularly in personal-emotional adjustment and tolerance for mathematical struggle. Ultimately, the study proposed the PROJECT M.I.R.A.C.L.E. (Mathematics Intervention for Resilience and Adjustment in College Learning Enhancement), a theory-driven program targeting growth mindset, coping strategies, and emotional regulation.

INTRODUCTION

The transition from secondary to tertiary education is one of the most critical periods in a student's academic journey. Freshmen students must simultaneously adapt to new academic rigors, social environments, emotional demands, and institutional expectations.

Among these challenges, mathematics continues to be one of the most difficult subjects for many students (Levine et al., 2020). In the Philippines, this concern is particularly pronounced. Filipino students posted a mathematics score of 355 in the Programme for International Student Assessment (PISA) 2022, far below the OECD average of 472 (OECD, 2023). Similarly, the country ranked among the lowest-performing nations in the Trends in International Mathematics and Science Study (TIMSS) 2019 (IEA, 2020). These results highlight the weak mathematical foundations with which many students enter college, potentially hindering their academic adjustment and persistence.

In this context, resilience toward mathematics plays a vital role. Johnston-Wilder and Lee (2010) defined mathematical resilience as the capacity to approach mathematical tasks with confidence, persistence, and positive coping strategies despite encountering difficulties. Theoretically, resilience functions as a protective factor that enables individuals to manage academic stress, overcome setbacks, and maintain motivation. Mathematics-specific resilience is particularly important because it is domain-specific; students may possess general resilience yet still struggle significantly when faced with mathematical challenges. This domain-specific resilience is theorized to support not only academic performance but also broader college adjustment by promoting adaptive coping, reducing anxiety, and fostering persistence across academic, emotional, and social domains.

College adjustment is a multidimensional construct that includes academic, social, personal-emotional, and institutional adjustment (Baker & Siryk, 1986). Successful adjustment is strongly linked to student retention, well-being, and academic achievement (Yaranay et al., 2021). However, students with low resilience toward mathematics are more prone to mathematics anxiety, avoidance behaviors, and emotional distress, which can negatively affect their overall college adjustment.

Although previous studies have investigated general resilience, mathematics performance, and college adjustment separately, limited empirical research has examined the relationship between resilience toward mathematics and college adjustment, particularly among Filipino freshmen students. Most existing studies focus on general psychological resilience or mathematics achievement outcomes, leaving a notable gap in understanding how mathematics-specific resilience influences the multifaceted nature of college adjustment (academic, social, personal-emotional, and institutional). This study addresses this gap by investigating the levels of resilience toward mathematics and college adjustment, differences according to profile variables, and the relationship between these two constructs among Filipino freshmen.

The present study is grounded on the theoretical framework of mathematical resilience and college adjustment theory. It is hypothesized that higher levels of resilience toward mathematics will be positively associated with better college adjustment, particularly in academic and personal-emotional dimensions. Findings of this study are expected to provide theoretical insights into the role of domain-specific resilience in student adjustment and offer practical implications for supporting freshmen students during the critical transition to higher education.

METHODS

Research Design

This study employed a quantitative descriptive-correlational research design. The design was chosen to determine the levels of resilience towards mathematics and college adjustment among freshmen students, examine differences in these variables when grouped according to profile variables (age, gender, senior high school strand, and program enrolled), and analyze the relationship between resilience towards mathematics and college adjustment.

A descriptive-correlational design is most appropriate for this study because it allows for the systematic description of the variables and the examination of the nature and strength of relationships between them without manipulating any variables (Creswell & Creswell, 2023). This approach aligns with the research objectives and enables the collection of quantifiable data that can be statistically analyzed to identify patterns and associations.

Respondents and Locale of the Study

The respondents of this study were 187 freshmen students from La Patria College Inc., Santiago City, Philippines. Proportionate stratified random sampling was used to select the participants. The population was first stratified according to academic programs, after which samples were drawn proportionally from each stratum.

The sample size of 187 was determined using the Krejcie and Morgan (1970) formula at a 95% confidence level and a 5% margin of error. This sampling technique ensured fair representation of all academic programs in the study.

Research Instrument

This study utilized two standardized instruments:

Student Adaptation to College Questionnaire (SACQ). The revised version by Yaranay et al. (2021) was originally developed by Baker and Siryk (1989) and further adapted by Dahmus and Bernardin (1992). This questionnaire measures college adjustment across four dimensions: academic adjustment, social adjustment, personal-emotional adjustment, and institutional adjustment using a seven-point Likert scale.

Resilience towards Mathematics Questionnaire, adapted from Atahan and Mert Uyangör (2024). This instrument assesses students' resilience towards mathematics using a five-point Likert scale.

Before the main data collection, a pilot test was conducted to determine the reliability of the instruments in the local context. The Resilience Towards Mathematics Questionnaire obtained a Cronbach's alpha value of 0.859, while the Student Adaptation to College Questionnaire (SACQ) obtained a Cronbach's alpha value of 0.925. These values indicate high internal consistency and confirm that both instruments are reliable for use in the present study. At last, to align the concept of the study, the term "adjustment" was used and preferred rather than "adaptation" because it specifically refers to students' ability to cope with and respond to the academic, emotional, and social demands of college life. Unlike adaptation, which often implies broader and long-term change, adjustment focuses on the immediate process of

managing environmental demands, making it more appropriate for the context and objectives of the study.

Data Gathering Procedure and Analysis

The data gathering procedure began with pilot testing of the research instruments. The Resilience Towards Mathematics Questionnaire obtained a Cronbach's alpha of 0.859, while the Student Adaptation to College Questionnaire (SACQ) obtained a Cronbach's alpha of 0.925, indicating high internal consistency and reliability in the local context.

Approval from the research adviser and panel members was secured prior to data collection. Formal permission was obtained from the Officer-in-Charge and the President of La Patria College Inc. Informed consent was secured from all participants after explaining the purpose of the study, their rights, and the assurance of confidentiality and anonymity. The researcher personally administered the printed questionnaires face-to-face during class hours after coordinating with faculty members. Respondents were given 15 to 30 minutes to complete the survey, and the researcher remained available for clarifications while maintaining neutrality. Completed questionnaires were checked for completeness, encoded, and prepared for analysis.

Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to describe the respondents' profile and the levels of resilience towards mathematics and college adjustment.

For inferential statistics, the Mann–Whitney U test and Kruskal–Wallis H test were employed to determine significant differences in the variables according to profile variables (age, gender, senior high school strand, and program enrolled). Spearman's rank-order correlation was used to examine the relationship between resilience towards mathematics and college adjustment.

Nonparametric tests were selected because the data were not normally distributed, as revealed by the Shapiro-Wilk tests of normality ($p < .05$ for most groups), and because the variables were measured on an ordinal Likert scale.

Ethical Considerations

This study involved minimal risk as it only required participants to respond to self-report survey questionnaires. No physical, medical, or invasive procedures were involved.

All participants were fully informed about the purpose of the study, their rights, and the voluntary nature of their participation. Informed consent was obtained prior to data collection. Respondents were assured that their participation was voluntary and that they could withdraw at any time without any penalty or academic repercussions.

To protect participant welfare, several safeguards were implemented. Confidentiality and anonymity were strictly observed. No identifying information was collected, and all data were reported in aggregate form only. Although some items in the Student Adaptation to College Questionnaire touched on personal-emotional experiences that could potentially cause mild discomfort, participants were explicitly informed that they could skip any question they found uncomfortable and could withdraw from the study at any point.

RESULTS AND DISCUSSION

This chapter presents, analyzes, and interprets the data gathered from the respondents. The results are organized according to the research questions and objectives of the study.

Table 1. Respondents' Profile in terms of Age, Gender, Senior High School Strand, and Program Enrolled

Profile		Frequency (n=187)	Percentage
Age	18	73	39.0
	19	86	46.0
	20	28	15.0
Gender	Male	124	66.3
	Female	63	33.7
Senior High School Strand	STEM	33	17.6
	ABM	9	4.8
	GAS	14	7.5
	HUMSS	90	48.1
	TECH-VOC	41	21.9
Program Enrolled	BSBA	16	8.6
	BSHM	33	17.6
	BEED	8	4.3
	BSED	11	5.9
	BSCRIM	13	7.0
	BSEE	39	20.9
	BSIT	67	35.8

The respondents consisted of 187 first-year college students. As shown in Table 1, the majority were 19 years old, male, graduates of the HUMSS strand from senior high school, and enrolled in BSIT and BSEE programs.

This demographic profile offers important context for the study. Most participants came from the HUMSS strand, which typically provides less mathematics exposure compared to STEM strands. This background may explain why many students need to rely more on personal resilience rather than strong prior knowledge when facing college mathematics. Additionally, the large number of students enrolled in BSIT and BSEE programs is noteworthy because these courses demand frequent engagement with mathematical concepts, making resilience towards mathematics especially relevant for their academic success and overall college adjustment.

Table 2. Students' Resilience towards Mathematics in terms of Value

Resilience towards Mathematics: Value	Mean	Interpretation
1. I think that knowing mathematics well will increase my working opportunities.	4.26	Strongly Agree
2. Mathematics will be encountered everywhere in life.	4.30	Strongly Agree
3. Knowing math will help me achieve my goals.	4.16	Strongly Agree
4. Math is necessary for my future.	4.10	Agree

5.	Having a good knowledge of mathematics positively affects my thinking power in many areas.	4.27	Strongly Agree
	Grand Mean	**4.22**	**Strongly Agree**

Participants demonstrated a high level of resilience towards mathematics in the Value dimension. This finding indicates that freshmen students strongly recognize the importance of mathematics for their academic success, future careers, and daily problem-solving. The strong valuation persists across different programs, including students from non-STEM strands like HUMSS, suggesting a broad awareness of mathematics as a foundational competency in higher education and the modern workforce.

This positive perception may be attributed to the increasing integration of mathematical and quantitative skills in technology-driven industries, particularly evident among students in BSIT, BSEE, and other STEM-related programs. Even non-STEM students appear to appreciate the instrumental value of mathematics, possibly influenced by the outcomes-based education emphasis in the Philippine K–12 curriculum and growing societal recognition of quantitative literacy. Such high-value placement serves as a motivational foundation that can buffer students when facing mathematical difficulties, promoting greater persistence and adaptive coping.

The result is consistent with Expectancy-Value Theory (Eccles & Wigfield, 2002), which posits that the subjective value attached to a domain significantly shapes motivation, engagement, and behavioral persistence. More importantly, the high value placed on mathematics appears to function as a protective factor that contributes to broader college adjustment. Students who view mathematics as highly valuable are more likely to invest effort, experience lower levels of mathematics anxiety, and demonstrate better academic and emotional adjustment during the first year of college. This finding helps explain the significant positive correlation observed between resilience towards mathematics and college adjustment in the present study.

While the strong valuation is encouraging, it remains to be seen whether this cognitive appreciation consistently translates into actual behavioral persistence when students encounter prolonged mathematical struggle, an area that warrants further investigation.

Table 3. Students' Resilience towards Mathematics in terms of Struggle

	Resilience towards Mathematics: Struggle	**Mean**	**Interpretation**
1.	I enjoy learning mathematics even when it is challenging.	4.06	Agree
2.	If I can't solve a difficult problem in maths, I don't give up.	3.94	Agree
3.	Even if I am not successful in math, my family always supports me.	4.25	Strongly Agree
	Grand Mean	**4.08**	**Agree**

Freshmen students reported moderate agreement on the Struggle dimension (M = 4.08). This indicates that while participants continue to experience difficulties in mathematics, these challenges rarely lead to disengagement or withdrawal. The finding reflects the realities of the first-year transition in the Philippine higher education context, where students move from the highly structured K–12 senior high school system to more demanding, independent college-level mathematics. Post-pandemic learning gaps and abrupt shifts in instructional

modalities may further intensify perceived struggle, yet students appear to persist due to the perceived relevance of mathematics to their future careers and emerging institutional support systems.

This result aligns with resilience literature suggesting that struggle can become productive when buffered by adaptive coping and contextual resources (Cassidy, 2015; Kooken et al., 2016). However, it contrasts with earlier studies reporting higher disengagement among transitioning students (Unay et al., 2016), possibly due to differences in institutional support and program characteristics in the current sample.

Table 4. Students' Resilience towards Mathematics in terms of Growth

Resilience towards Mathematics: Growth	Mean	Interpretation
1. Even good mathematicians can find it difficult to solve problems.	4.16	Strongly Agree
2. Difficulties are normal when learning maths.	4.37	Strongly Agree
3. When doing maths, everyone makes mistakes from time to time.	4.26	Strongly Agree
Grand Mean	**4.26**	**Strongly Agree**

Students showed strong agreement on the Growth dimension (M = 4.26). This suggests a generally adaptive mindset wherein mistakes and difficulties are increasingly viewed as opportunities for improvement. Such orientation likely stems from greater exposure to learner-centered pedagogies in college, which differ markedly from the rote-learning emphasis prevalent in many Philippine basic education classrooms.

The finding supports growth mindset theory (Dweck, 2006; Yeager & Dweck, 2012) and recent local evidence (Co & Dela Cruz, 2025). Nevertheless, it partially contradicts studies reporting persistently fixed mindsets among Filipino students (Alavata, 2016), indicating that college entry may serve as a critical window for mindset shifts when supported by appropriate instructional environments.

From a theoretical perspective, the result aligns with resilience and growth mindset frameworks, which suggest that students who view abilities as improvable are more likely to persist in challenging academic situations. Practically, this implies that strengthening growth mindset interventions and reflective learning activities may further enhance students' mathematical resilience and support their long-term academic adjustment.

Table 5. Students' Resilience towards Mathematics in terms of Culture

Resilience towards Mathematics: Culture	Mean	Verbal Interpretation
1. My family has high expectations for me to be successful in maths.	3.52	Agree
2. My parents encourage me to do well in mathematics.	3.68	Agree
3. My family thinks math is important.	3.78	Agree
Grand Mean	**3.66**	**Agree**

The Influence of Family Culture dimension obtained the lowest mean (M = 3.66). This implies that although family expectations remain present, they exert a declining influence on resilience towards mathematics as students enter college. The shift highlights a developmental transition toward greater academic autonomy and self-regulation, consistent with the

increased independence demanded in tertiary education.

This finding infers that students' engagement in mathematics is increasingly shaped by internal factors such as personal motivation, coping strategies, and academic self-management rather than external family pressures or expectations. In the college context, students are often required to independently navigate academic challenges, which may reduce the direct impact of family culture on their day-to-day learning experiences.

Align from the perspective of Callaman (2023), who found that students tend to develop independent coping strategies such as time management, persistence, and resourcefulness in handling academic demands. Similarly, Nabayra (2022) emphasized that students maintain positive attitudes and persistence despite difficulties, reflecting adaptability and self-directed learning behaviors that are less dependent on external influence.

Consistent with self-regulated learning and resilience frameworks, which emphasize that as learners mature academically, internal coping mechanisms and autonomy become stronger predictors of persistence and performance. Nearly, this suggests that interventions should focus more on strengthening students' self-regulation skills and intrinsic motivation rather than relying heavily on family-based support mechanisms.

Table 6. Students' Adjustment to College: Personal-emotional

Student Adjustment to College: Personal Emotional	Mean	Interpretation
1. I have experienced sadness and quite a few mood swings lately.	5.36	Agree
2. I am not able to control my emotions lately.	4.72	Somewhat Agree
3. I find it difficult to cope with the stress that university causes me.	4.59	Somewhat Agree
4. I feel tired most of the time lately.	5.13	Somewhat Agree
5. I don't feel very motivated to study lately.	4.36	Somewhat Agree
6. I have headaches lately.	4.48	Somewhat Agree
7. I often feel confused.	4.95	Somewhat Agree
8. I've been feeling nervous lately.	4.95	Somewhat Agree
9. I find it difficult to be alone and have so many responsibilities.	4.79	Somewhat Agree
10. I don't sleep well lately.	5.12	Somewhat Agree
11. I feel good lately.	5.03	Somewhat Agree
12. I get mad very easily lately.	4.49	Somewhat Agree
13. I think I am not able to do everything that is required of me.	4.35	Neither Agree nor Disagree
14. I'm not doing it well enough because of the amount of work I do.	4.51	Somewhat Agree
15. I feel that I can manage my personal and academic challenges effectively.	5.26	Somewhat Agree
Grand Mean	**4.81**	**Somewhat Agree**

Personal-emotional adjustment obtained the lowest mean among the dimensions (M = 4.81). This moderate level suggests that many freshmen experience considerable emotional strain as they navigate increased academic pressure, new social environments, and greater personal independence. The transitional imbalance between demands and coping resources appears to generate persistent stress and emotional challenges, which may be exacerbated by

post-pandemic adjustment difficulties and the sudden shift from the supportive structure of senior high school.

This condition is explained by the heightened academic pressure, unfamiliar learning environment, and increased independence required in tertiary education, which often overwhelm first-year students who are still developing effective coping and time management strategies. As a result, emotional strain becomes more evident, particularly when academic demands exceed students' current self-regulation skills.

This finding aligns with previous local studies linking mathematics anxiety, ineffective study habits, and transition stress to poorer emotional adjustment (Francisco, 2020; Navida, 2022). It also supports broader adaptation theories that emphasize emotional regulation as a foundational requirement for successful college adjustment. Practically, the result highlights personal-emotional adjustment as a priority area for intervention, as unresolved emotional difficulties may undermine other adjustment domains.

Academically, this supports adjustment and resilience frameworks, which propose that emotional adjustment is closely linked to students' coping strategies and academic self-regulation. This means that interventions should prioritize strengthening emotional regulation, stress management, and effective study habits to improve freshmen students' overall adjustment to college life.

Table 7. Students' Adjustment to College: Social

Student Adjustment to College: Social	Mean	Interpretation
1. I have good friends and acquaintances in the Career to tell them about any problem.	5.29	Agree
2. I'm adjusting well to university.	5.07	Somewhat Agree
3. I am meeting people and making friends at the university.	5.71	Agree
4. I think I fit in well at the university.	5.25	Somewhat Agree
5. I think I have enough social skills to integrate well to the university life.	5.18	Somewhat Agree
6. I am satisfied with my life at the university.	5.33	Agree
7. I have close personal relationships at the university.	4.96	Somewhat Agree
8. I have felt very lonely in the Career lately.	4.31	Somewhat Agree
Grand Mean	**5.14**	**Somewhat Agree**

Students reported relatively high agreement regarding social adjustment (M = 5.14). This indicates that freshmen are progressively forming new peer relationships and integrating into university social life, although adjustment remains incomplete during the early months of transition. The challenges of building connections with peers from diverse backgrounds, adjusting to new social norms, and overcoming initial social anxiety likely contribute to this still-developing pattern.

This pattern is explained by the unfamiliarity of the university environment, where students are required to build new social networks from diverse backgrounds, adjust to different communication dynamics, and overcome initial social anxiety. These transitional challenges often result in a mixed level of social adjustment, where students simultaneously experience inclusion and occasional feelings of isolation.

The result is consistent with Tinto's (1993) Student Integration Theory and empirical

evidence highlighting the importance of peer relationships and sense of belonging for college success (Haktanir et al., 2021; Juvonen et al., 2012). It suggests that while social integration develops naturally for most students, structured peer-support initiatives could accelerate this process during the critical first semester. In addition, Karjanto and Acelajado (2022) found that increased participation and collaborative engagement enhance student motivation and improve overall academic adjustment.

These results reinforce student integration and adjustment frameworks, which highlight the central role of peer relationships in shaping college adjustment. Moreover, this implies that universities should strengthen peer-support systems, collaborative learning opportunities, and student engagement programs to enhance freshmen students' social integration and overall adjustment to college life.

Table 8. Students' Adjustment to College: Institutional

Student Adjustment to College: Institutional	Mean	Interpretation
1. I sometimes feel uncertain about continuing my studies in this university.	4.43	Somewhat Agree
2. I hope to finish my studies in this faculty.	5.94	Agree
3. I feel confident that I chose the right academic program.	5.74	Agree
4. I am satisfied with my decision to go to college.	6.12	Agree
5. I am satisfied with the university or college where I am currently enrolled.	5.91	Agree
6. I know why I am in college and what I want to get out of it.	5.54	Agree
7. My interests are related to my chosen academic program.	5.75	Agree
8. I am seriously considering taking time off from college and continuing later.	4.65	Somewhat Agree
9. My academic goals are well defined.	5.48	Agree
10. I doubt the value that a university career can have.	4.99	Somewhat Agree
Grand Mean	**5.46**	**Agree**

Institutional adjustment recorded the highest mean (M = 5.46). This strong level reflects high commitment, satisfaction, and a developing sense of belonging toward the university and chosen academic programs. Positive program-institution fit and initial optimism upon entry into higher education likely contribute to this favorable perception, even amid other transitional difficulties.

This positive adjustment is attributed to institutional factors such as program alignment with student interests, supportive academic services, and students' initial optimism and motivation upon entering higher education. Although some uncertainty remains, particularly in terms of long-term academic direction and persistence, the overall pattern reflects a generally favorable perception of the institution.

This finding is consistent with Tinto's Theory of Student Integration, which emphasizes that institutional commitment plays a critical role in student retention and persistence in higher education. It is also supported by Francisco (2020), who found that positive attitudes toward the learning environment, combined with effective academic strategies, contribute significantly to better overall student adjustment.

This reinforces student integration models, which highlight institutional attachment as a key dimension of successful college adjustment. Also, the result signifies that maintaining

institutional support systems, reinforcing academic advising, and sustaining student engagement initiatives are essential in strengthening long-term retention and improving freshmen students' adjustment outcomes.

Table 9. Students' Adjustment to College: Academic

Student Adjustment to College: Academic	Mean	Interpretation
1. I am satisfied with the subjects of this course.	5.71	Agree
2. I am satisfied with the quality of the subjects I have.	5.73	Agree
3. I am satisfied with the number and variety of subjects I have.	5.56	Agree
4. I am very satisfied with the teachers that I have in this course.	6.09	Agree
5. I like the work I do in the subjects.	5.99	Agree
Grand Mean	**5.81**	**Agree**

Participants demonstrated high agreement on academic adjustment (M = 5.81). This suggests satisfactory engagement with academic content, instructional quality, and overall learning processes, although adjustment remains developmental rather than fully stabilized. The transition from structured senior high school learning to more autonomous and demanding college expectations appears to create a generally positive but still-evolving academic experience.

This is explained by the transition from structured senior high school learning to a more independent and demanding college environment, where students are required to manage heavier workloads, adapt to different teaching styles, and develop more autonomous learning strategies. These adjustments often result in a generally positive but still evolving academic experience.

The result aligns with studies emphasizing the role of instructional quality, study skills, and positive learning attitudes in college academic adjustment (Capuno et al., 2019; Credé & Niehorster, 2012; Pizon & Ytoc, 2021). These results validate academic adjustment and student integration frameworks, which highlight the role of learning environment quality and student engagement in successful adjustment. Empirically, the findings suggest that strengthening instructional support, enhancing study skills training, and promoting active learning strategies may further improve students' academic adjustment and sustain their academic success.

Table 10. Differences in the Resilience towards Mathematics and Adjustments to College of the respondents when grouped according to Age

Variables	18 y/o	19 y/o	20 y/o	Kruskal-Wallis H	p-value
Resilience towards Mathematics					
• Value	4.21	4.22	4.26	0.30^{ns}	p=.86
• Struggle	4.15	4.07	3.96	3.21^{ns}	p=.20
• Growth	4.28	4.32	4.05	3.66^{ns}	p=.16
• Culture	3.62	3.68	3.71	0.51^{ns}	p=.78

Student Adjustment to College					
• Personal-emotional	4.77	4.79	4.94	0.64^{ns}	p=.73
• Social	5.15	5.07	5.30	1.62^{ns}	p=.45
• Institutional	5.45	5.37	5.73	5.07^{ns}	p=.08
• Academic	5.84	5.82	5.73	0.02^{ns}	p=.99

The results on age differences indicate that there is no significant variation in students' resilience towards mathematics and their adjustment to college across age groups, as all computed p-values (0.08–0.99) were greater than the 0.05 level of significance. This suggests that age is not a determining factor in shaping how freshmen students cope with mathematical challenges or adjust to university life.

This finding is explained by the relatively narrow age range of the respondents (18–20 years old), where students are generally at a similar developmental and academic stage. At this point in their educational trajectory, differences in maturity or cognitive development are minimal, and students are more likely to share comparable academic experiences, particularly in their first year of college. As a result, their responses reflect a largely uniform level of resilience and adjustment regardless of age.

The finding supports the view that resilience and adjustment during college transition are shaped more by psychosocial and environmental factors than by age (Cassidy, 2015). Practically, this implies that intervention programs can be uniformly designed for the entire freshman cohort without age-based segmentation.

In theory, this supports resilience and adjustment frameworks, which suggest that adaptive capacity is shaped more by contextual and psychosocial factors than by age. Operationally, it implies that interventions aimed at improving mathematical resilience and college adjustment should be designed for all freshmen students rather than being differentiated based on age group.

Table 11. Differences in the Resilience towards Mathematics and Adjustments to College of the respondents when grouped according to Gender

Variables	Male	Female	Z	p-value
Resilience towards Mathematics				
• Value	4.17	4.31	1.41^{ns}	p=.16
• Struggle	4.03	4.19	1.31^{ns}	p=.19
• Growth	4.19	4.41	1.75^{ns}	p=.08
• Culture	3.70	3.59	0.71^{ns}	p=.48
Student Adjustment to College				
• Personal-emotional	4.61	5.19	4.35^{*}	p<.001
• Social	5.09	5.23	1.23^{ns}	p=.22
• Institutional	5.46	5.45	0.31^{ns}	p=.75
• Academic	5.78	5.88	0.82^{ns}	p=.41

Most dimensions of resilience towards mathematics and college adjustment showed no significant differences between male and female students. However, a significant difference emerged in personal-emotional adjustment. This suggests that while male and female freshmen experience similar levels of mathematical resilience and most adjustment domains,

they differ in how they manage emotional stress and psychological demands during college transition.

This finding is consistent with Tamres, Janicki, and Helgeson (2002), who reported that females are more inclined toward emotion-focused coping strategies, while males more frequently use problem-focused approaches. Similarly, Taylor et al. (2000) found that these gendered coping differences contribute to variations in emotional regulation and adjustment in stressful academic environments.

This supports stress and coping frameworks, which emphasize that emotional adjustment is influenced by coping style rather than overall academic ability. Applicably, the result implies that support programs should particularly address emotional regulation and stress management, with interventions that are sensitive to different coping tendencies among male and female students, rather than assuming uniform emotional adjustment needs across genders.

Table 12: Differences in the Resilience towards Mathematics and Adjustments to College of the respondents when grouped according to Senior High School Strand

Variables	STEM	ABM	GAS	HUMSS	TECH-VOC	Kruskal-Wallis H	p-value
Resilience towards Mathematics							
• Value	4.37	4.36	4.33	4.20	4.06	3.00^{ns}	p=.56
• Struggle	4.20	3.96	4.21	4.10	3.94	4.02^{ns}	p=.40
• Growth	4.63	4.26	4.38	4.17	4.14	15.84^{*}	p<.001
• Culture	3.74	3.56	3.55	3.65	3.68	0.62^{ns}	p=.96
Student Adjustment to College							
• Personal-emotional	4.44	5.29	4.81	4.87	4.86	7.55^{ns}	p=.11
• Social	4.87	5.43	5.39	5.21	5.03	4.27^{ns}	p=.37
• Institutional	5.49	5.34	5.36	5.54	5.30	1.87^{ns}	p=.76
• Academic	5.72	5.76	5.74	5.97	5.58	7.84^{ns}	p=.10

Legend: Science, Technology, Engineering, and Mathematics (STEM), Accountancy, Business and Management (ABM), General Academic Strand (GAS), Humanities and Social Sciences (HUMSS), and Technical Vocational (TECH-VOC)

Significant differences were observed across senior high school strands, particularly in the Growth dimension of resilience towards mathematics ($H = 15.84$, $p < .001$). Students from STEM and other math-intensive strands demonstrated stronger growth-oriented beliefs compared to those from non-STEM strands.

This difference likely stems from varying levels of prior exposure to complex mathematical problem-solving. Strands with greater mathematical intensity provide more frequent opportunities to experience struggle and develop persistence, thereby strengthening growth mindsets. The finding supports the idea that resilience is contextually shaped by previous educational experiences (Alipio, 2020; Co & Dela Cruz, 2025). Practically, this calls for strand-sensitive bridging programs, especially for students coming from non-math-intensive strands.

Logically, these studies reinforce the present finding that resilience towards mathematics, particularly its growth dimension, is not uniformly distributed but is shaped by educational background and learning exposure. Pragmatically, it means that interventions aimed at strengthening mathematical resilience should be strand-sensitive, with targeted reinforcement for students from non-mathematics-intensive programs to ensure equitable development of growth-oriented learning beliefs. Theoretically, the results support the idea that resilience is not only an individual trait but also a contextually shaped construct influenced by prior academic experiences.

Table 13: Differences in the Resilience towards Mathematics and Adjustments to College of the respondents when grouped according to Program Enrolled

Variables	BSBA	BSHM	BEED	BSED	BSCRIM	BSEE	BSIT	Kruskal-Wallis H	p-value
Resilience towards Mathematics									
• Value	4.18	4.29	4.40	4.16	4.35	4.35	4.08	6.47^{ns}	p=.37
• Struggle	3.94	4.22	4.54	4.21	4.26	4.11	3.93	13.14*	p<.04
• Growth	4.21	4.31	4.29	4.76	4.18	4.40	4.10	13.16*	p<.04
• Culture	3.58	3.69	3.96	3.18	3.59	3.76	3.67	3.64^{ns}	p=.72
Student Adjustment to College									
• Personal-emotional	5.37	4.85	5.12	5.41	4.80	4.94	4.44	23.63*	p<.001
• Social	5.08	5.21	5.53	5.59	5.03	5.16	5.00	7.88^{ns}	p=.25
• Institutional	5.38	5.40	5.95	5.75	5.54	5.43	5.40	6.01^{ns}	p=.42
• Academic	5.94	5.86	5.85	6.31	5.88	5.84	5.65	5.76^{ns}	p=.45

Legend: Bachelor of Science in Business Administration (BSBA), Bachelor of Science in Hospitality Management (BSHM), Bachelor of Elementary Education (BEED), Bachelor of Secondary Education (BSED), Bachelor of Science in Criminology (BSCRIM), Bachelor of Science in Electrical Engineering (BSEE), and Bachelor of Science in Industrial Technology (BSIT)

Significant differences were found across enrolled programs in the Struggle and Growth dimensions of resilience towards mathematics, as well as in personal-emotional adjustment. Notably, BEED students showed the highest tolerance for mathematical struggle, while BSIT students recorded the lowest.

These disciplinary variations suggest that curriculum design and the frequency of mathematical engagement influence resilience development. Programs with sustained emphasis on foundational mathematical skills appear to foster greater persistence, whereas programs with different focal areas may lead to quicker disengagement when difficulties arise. This reinforces that mathematical resilience is not solely an individual trait but is also constructed through disciplinary context and academic exposure (Xu & Dieckmann, 2025). The findings underscore the need for program-specific support strategies.

From a practical standpoint, this suggests that targeted support mechanisms should be considered for programs with lower resilience levels, particularly in strengthening persistence and coping strategies in mathematics-related tasks. Ideally, it reinforces discipline-based variations in resilience development, suggesting that academic context is a key factor in shaping students' adaptive responses to learning challenges.

Table 14. Relationship of Resilience towards Mathematics and Adjustments to College of the Respondents

Adjustment to College	Resilience Towards Mathematics							
	Value		Struggle		Growth		Culture	
	Corr.	p-val.	Corr.	p-val.	Corr.	p-val.	Corr.	p-val.
Personal Emotional	.29**	p<.001	.227**	0.002	.198**	0.007	.319**	p<.001
Social	.236**	0.001	.331**	p<.001	.235**	0.001	.372**	p<.001
Institutional	.160*	0.029	.279**	p<.001	.151*	0.039	.298**	p<.001
Academic	.235**	0.001	.258**	p<.001	.184*	0.012	.213**	p<.003

**. Corr. is significant at the .01 level 2-tailed

All dimensions of resilience towards mathematics were significantly and positively correlated with all dimensions of college adjustment ($p < .05$). This implies that resilience towards mathematics is positively associated with students' ability to adjust to college life, suggesting that students who are more persistent, confident, and adaptive in handling mathematical challenges are also more capable of managing academic demands, emotional stress, and social transitions in the university setting. In other words, resilience towards mathematics appears to function as a supporting psychological resource that extends beyond mathematics performance and contributes to broader college adjustment.

The moderate correlations extend domain-specific resilience literature by demonstrating its protective role in holistic college adjustment among Filipino freshmen, consistent with adaptive mindset theory (Yeager & Dweck, 2012).

Intervention Program

PROJECT M.I.R.A.C.L.E.
Mathematics Intervention for Resilience and Adjustment in College Learning Enhancement

General Objective

To enhance freshmen students' resilience towards mathematics and improve their overall adjustment to college through targeted academic, psychological, and peer-support interventions.

Program Components	Focus	Duration	Activities	Person-in-Charge	Expected Output
Math Confidence Building Module (MATH-dali Matuto)	Strengthening Mathematical Resilience	3 weeks	• Weekly "Low-Stress Math Workshops" (such as problem-solving without grading pressure) • Step-by-step guided remediation sessions • "Mistake-to-Mastery" reflection journals (students	Mathematics Teachers, Instructors or Facilitators.	Improved self-efficacy and reduced math anxiety

			analyze errors positively) • Confidence-building math games and challenges		
Academic Adjustment Enhancement Sessions (MATH-Maayos na Kolehiyo)	Helping students adapt to college learning demands	3 weeks	• Study skills training (note-taking, time management, exam strategies) • Orientation on college academic expectations • Peer-assisted learning groups (PALs) • Faculty mentoring check-ins	Math Teachers, Guidance Counselors, Trained Peer Tutors	Better academic adjustment and study habits
Psychological Resilience Development (MATH-Pinagtibay na Puso)	Emotional regulation and stress coping	3 weeks	• Stress management and mindfulness workshops • Cognitive reframing exercises (handling failure in math positively) • Guided reflection on academic struggles • Short counseling/referral sessions for at-risk students	Guidance Counselors, Trained Peer Tutors	Improved emotional stability and coping mechanisms
Peer Support and Learning Community (Mas MATH-Tulungan)	Social integration and motivation	3 weeks	• "Math Buddy System" pairing high and low-performing students • Group problem-solving sessions • Student-led math support clubs • Sharing circles for academic struggles	Math Teachers, Guidance Counselors, Trained Peer Tutors	Stronger sense of belonging and reduced isolation
Motivation and Career Relevance Integration (Mas MATH-Igihan)	Strengthening value of mathematics	3 weeks	• Talks linking mathematics to chosen careers (BSBA, BS Crim, etc.) • Alumni sharing sessions • Real-life applied math projects	Math Teachers, Guidance Counselors, Trained Peer Tutors	Increased perceived value of mathematics and motivation

			• Career goal mapping sessions		

PROJECT M.I.R.A.C.L.E. is a structured intervention program designed to enhance students' mathematical resilience and improve their overall adjustment to college life. It is anchored on the Expectancy–Value Theory (Eccles & Wigfield), which explains that students persist in academic tasks when they perceive them as valuable and relevant; the Growth Mindset Theory (Dweck), which emphasizes that abilities in mathematics can be developed through effort and strategy; the Student Integration Theory (Tinto), which highlights the importance of academic and social integration in student persistence; and Resilience Theory, which focuses on adaptive coping, emotional regulation, and positive response to academic stress. Collectively, these theories explain how cognitive beliefs, emotional regulation, and social support interact to shape students' resilience and adjustment.
The program is implemented through five interrelated components, each designed to target specific dimensions of resilience and adjustment.

Objectives

The program aims to achieve the following:

1. Enhance students' resilience toward mathematics, particularly in the dimensions of Struggle and Growth.
2. Improve personal-emotional adjustment through better stress management and coping strategies.
3. Facilitate smoother academic and social integration among incoming freshmen.
4. Promote long-term persistence and help-seeking behaviors in mathematics-related courses.

Key Components

The intervention consists of four interconnected modules:

1. Math Confidence Building Module (MATH-dali Matuto)
   This component aims to strengthen students' mathematical resilience by reducing math anxiety and enhancing confidence through supportive learning experiences. Guided by Growth Mindset Theory (Dweck) and Resilience Theory, it emphasizes that mistakes are part of learning and can be improved through effort and reflection. Activities include low-stress problem-solving sessions, guided remediation, reflective "mistake-to-mastery" journals, and gamified exercises. The expected outcome is improved self-efficacy and reduced mathematics anxiety.

2. Academic Adjustment Enhancement Sessions (MATH-Maayos na Kolehiyo)
   This module focuses on improving students' adjustment to college academic demands by developing essential study skills such as time management, note-taking, and exam preparation. Anchored on Tinto's Student Integration Theory, it highlights the role of academic support and mentoring in successful adjustment. Activities include study skills training, peer-assisted learning, and faculty mentoring sessions. The expected outcome is improved academic adjustment and study habits.

3. Psychological Resilience Development (MATH-Pinagtibay na Puso)
   This component enhances emotional regulation and coping strategies in response to academic stress. Grounded in Resilience Theory and Growth Mindset Theory, it promotes adaptive thinking through mindfulness activities, cognitive reframing, and reflective exercises. Counseling support is also provided for students experiencing difficulty. The expected outcome is improved emotional stability and coping mechanisms.

4. Peer Support and Learning Community (Mas MATH-Tulungan)
   This module strengthens social adjustment by promoting peer interaction and collaborative learning. Based on Tinto's Student Integration Theory, it emphasizes that a sense of belonging supports persistence and adjustment in college. Activities include buddy systems, group problem-solving, and peer support sessions. The expected outcome is improved social integration and reduced academic isolation.

5. Motivation and Career Relevance Integration (Mas MATH-Igihan)
   This component enhances students' motivation by linking mathematics to real-life applications and future careers. Anchored on Expectancy–Value Theory (Eccles & Wigfield), it emphasizes that perceived value increases engagement and persistence in learning. Activities include career talks, alumni sharing, and applied mathematics tasks. The expected outcome is increased perceived value of mathematics and motivation.

Implementation Strategies

PROJECT M.I.R.A.C.L.E. will be implemented during the first semester of the academic year using a phased approach:

1. Phase 1. (Weeks 1–3): Orientation, baseline assessment using the same instruments, and program familiarization.
2. Phase 2-3 (Weeks 4–9): Intensive 8-week intervention (one 2-hour session per week).
3. Phase 4-5 (Weeks 10–15): Follow-up mentoring, reinforcement activities, and post-intervention assessment.

The program will initially target 100–150 incoming freshmen, with priority given to students from non-STEM senior high school strands and programs that showed lower resilience scores. Delivery will be blended (face-to-face workshops supplemented with an online learning management system for reflections and resources).

Expected Outcomes and Evaluation

It is anticipated that participants will show significant improvements in resilience towards mathematics (especially Struggle and Growth dimensions) and personal-emotional adjustment. Long-term indicators will include higher retention rates in mathematics courses, improved academic performance, and increased help-seeking behavior.

Program effectiveness will be evaluated using a quasi-experimental pre-test and post-test design with a control group. Quantitative data from the validated instruments will be supplemented with qualitative feedback from student reflections and focus group discussions.

Significance of the Intervention

PROJECT M.I.R.A.C.L.E. addresses a critical gap by integrating mathematics-specific resilience training with holistic college adjustment support. Unlike generic orientation programs, it offers a focused, theory-driven, and contextually relevant intervention tailored to the transitional challenges faced by Filipino freshmen. Successful implementation could serve as a model for other higher education institutions seeking to improve student persistence and well-being.

CONCLUSION AND FUTURE WORKS

Based on the findings of the study, it can be concluded that freshmen students generally possess a positive level of resilience towards mathematics, particularly in valuing its importance and embracing challenges as part of learning. This suggests that students are not discouraged by difficulties in mathematics but instead maintain a mindset that supports persistence and growth.

Furthermore, students are generally well-adjusted to college life, especially in terms of social interaction, institutional commitment, and academic engagement. However, moderate challenges remain in the area of personal-emotional adjustment, indicating that students still experience stress and emotional difficulties as part of their transition to college.

The lack of significant differences across most profile variables implies that resilience and adjustment are not strongly influenced by demographic factors such as age, academic background, or program enrolled. However, gender differences in adjustment suggest that female students may have more effective coping mechanisms or support systems that facilitate better adjustment to college life. Most importantly, the significant moderate relationship between resilience towards mathematics and student adjustment to college confirms that resilience plays a crucial role in helping students cope with academic and personal challenges.

This highlights the importance of fostering resilience as a means of improving overall student adjustment and success in higher education. Accordingly, PROJECT M.I.R.A.C.L.E. Mathematics Intervention for Resilience and Adjustment in College Learning Enhancement is highly recommended as an intervention program.

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CONFLICT OF INTEREST

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

DECLARATION OF AI USE

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