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Analysis on the Attitudes and Mathematics Proficiency among the First Year Students in a Higher Education Institution

Richard Camacho: *Colegio De Getafe Poblacion, Getafe, Bohol, Philippines.*

ABSTRACT: *This study investigated the relationship between students' attitudes toward mathematics and their mathematics proficiency among the students enrolled. Using a descriptive research design, data were gathered through a researcher-developed Mathematics Proficiency Test and the standardized Attitudes Toward Mathematics Inventory (ATMI). The results showed that while students generally held neutral attitudes in terms of self-confidence, motivation, and enjoyment, they displayed a positive perception of the value of mathematics. Despite this, over 85% of students performed below the proficient level. A significant difference in attitudes was found among students from different academic programs, though no significant difference was observed in their mathematics proficiency. These findings underscore the importance of addressing both cognitive and affective factors in mathematics education and call for interventions that foster motivation, confidence, and engagement to support academic success in the subject.*

***Key words**: Enjoyment, mathematics attitudes, proficiency, self-confidence, value.*

1. Introduction

Mathematics plays a crucial role in developing students' analytical thinking and problem-solving capabilities, especially at the university level. Fields such as science, engineering, and business place a premium on mathematical skills, linking them directly to academic achievement and employability prospects (Guinocor et al., 2020). Yet, many students arrive at university lacking the foundational skills and confidence needed to succeed in math-heavy courses. This gap in preparedness can lead to struggles that go beyond the classroom, affecting their overall academic progression and job readiness (Abdullah et al., 2019).

A student's attitude toward mathematics and how they feel about and perceive the subject can dramatically influence their success. Attitude reflects more than just liking or disliking math; it includes motivation, confidence, anxiety, and how valuable they perceive the subject to be (Tapia & Marsh, 2005). Negative feelings like math anxiety or fear of failure often result in avoidance and underperformance. Conversely, when students see math as relevant and believe in their ability to succeed, they tend to persist and perform better (Panerio, 2016). Building positive mathematical attitudes early on is essential for long-term educational success (Saleh, 2015).

Moreover, a growing number of studies show a significant correlation between attitudes and math proficiency. Students with high confidence and interest in math are more likely to achieve better results (Subia et al., 2018). In contrast, those with negative views toward the subject often perform below expectations. For example, in one Philippine university, students who demonstrated a stronger orientation toward math study habits achieved significantly better GPAs (Guinocor et al., 2020). These patterns highlight the powerful role of emotions and self-perception in academic outcomes.

As students transition to higher education, math becomes more abstract and complex, often heightening anxiety and detachment. Traditional teaching methods emphasizing memorization over understanding can worsen this disconnect. However, when educators implement reflective, student-centered approaches such as collaborative problem-solving, students tend to develop more positive attitudes and deeper comprehension

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(Yusof & Tall, 1998). Encouraging students to actively engage with math concepts, rather than passively absorb them, appears to be a key strategy for improving both confidence and competence (Alkhateeb & Hammoudi, 2006). In addition, students' math attitudes and performance don't exist in a vacuum, they are shaped by a variety of background factors. These include gender, prior academic achievement, family support, and socioeconomic conditions. A study from Ethiopia found male students and those with strong high school performance had more positive attitudes toward math (Zeleke & Semela, 2015). Similarly, parental involvement and quality of prior instruction have been shown to influence both confidence and motivation in math (Guinocor et al., 2020). These findings suggest the need for a holistic approach to improving math outcomes, one that addresses not just what students learn, but also how and why they engage with the subject.

While global research helps build a general understanding, local studies are necessary to tailor solutions to specific educational environments. In the case of the Colegio De Getafe Poblacion, Getafe, Bohol, understanding how second-year students feel and perform in mathematics offers valuable insight. This community of learners brings diverse experiences and challenges that may not mirror national or international trends. By investigating both the emotional and academic experiences of these students, educators can design programs that meet their unique needs and help foster a culture of mathematical confidence and success.

2. Review of Related Literature

The connection between how students feel about mathematics and how well they perform in it has been widely studied. Many researchers agree that positive attitudes, like enjoying math, feeling confident, and staying motivated are strong indicators of good performance. In the Philippines, one study revealed that high school students who valued and enjoyed math tended to perform better in assessments, while those with low confidence and motivation consistently struggled (Laranang & Bondoc, 2020). A similar pattern appeared in university students, where a study found that while self-regulated learning played a role, attitudes were actually the strongest predictor of mathematics achievement (Saleh, 2015). These results suggest that fostering a positive mindset is just as important as teaching the content itself.

Once students reach university, their attitudes toward math often change, for better or worse. Factors like more abstract content, high expectations, and traditional lecture formats can discourage even previously motivated learners. For example, students who experienced a collaborative, problem-solving-based course reported improved attitudes, feeling less anxious and more engaged with the material (Yusof & Tall, 1998). Unfortunately, when they returned to conventional lecture styles, their positive attitudes faded quickly. Similarly, another study found that students who approached learning math with curiosity and a desire to understand rather than memorize achieved higher marks and maintained more positive outlooks (Alkhateeb & Hammoudi, 2006). These shifts show that instructional style can deeply influence students' feelings about math. Local and international research continues to confirm the idea that when students feel good about math, they tend to do better. In a 2023 study, students who believed math was useful and had confidence in their abilities performed significantly better in problem-solving tasks (Apus & Quirap, 2024). Likewise, another study involving students from various cultural backgrounds found that enjoyment, value, and self-confidence each played a distinct and meaningful role in their academic outcomes (Hwang & Son, 2021). These findings highlight how critical it is for educators to go beyond just teaching the curriculum to also build a classroom culture that encourages confidence and a love for learning math.

3. Methodology

This study employed a descriptive research design to investigate the link between students' attitudes and their mathematics proficiency, while also identifying differences among academic programs. This method was selected because it facilitates the examination of existing conditions without requiring manipulation of variables making it well-suited for comparing natural groupings such as students enrolled in various disciplines (Cantrell, 2011; Polit & Beck, 2007). Observing students in their actual academic settings, the study aimed to yield results that reflect authentic learning experiences and attitudinal differences. Descriptive designs are often used in educational research to provide a snapshot of group patterns and support informed pedagogical decisions. This method was chosen to ensure equal opportunity for participation and to avoid sampling bias (Cochran, 1977). Because each student had the same chance of selection, the process enhanced the representativeness of the findings across academic tracks. All participants were active enrollees with completed subject prerequisites, making them appropriate subjects for comparing proficiency and attitude.

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Two instruments were used to collect data: a researcher-developed Mathematics Proficiency Test aligned with the CHED General Education Curriculum and the validated Attitudes Toward Mathematics Inventory (ATMI) created by Tapia and Marsh (2004). The proficiency test comprised 40 multiple-choice questions addressing foundational topics such as patterns in nature, the Fibonacci sequence, logic, and set theory. Meanwhile, the ATMI measured four core dimensions of attitude: self-confidence, motivation, enjoyment, and perceived value of mathematics. These components were evaluated using a five-point Likert scale, ranging from strongly disagree to strongly agree, allowing for nuanced assessment of emotional and psychological engagement. Data collection was implemented in a controlled, face-to-face setting using the Blackboard Learning Management System. Each student (total of 241) was given 90 minutes to complete both instruments during a scheduled session. The administration followed three organized stages: preparation and informed consent, test and survey implementation, and post-assessment data processing. The preparation phase included coordination with instructors and briefing sessions. Consent forms were distributed and signed before testing began, ensuring ethical compliance. Proctors were present throughout to facilitate smooth conduct and address technical issues, ensuring standardization across all groups. Collected data were analyzed through descriptive and inferential statistics to interpret patterns and detect significant differences. Weighted means were used to determine average scores in both the proficiency test and attitude inventory, while standard deviation provided insight into score dispersion. One-way ANOVA was applied to examine whether the differences in mathematics performance and attitudes among the three academic programs were statistically significant. This comprehensive analysis aimed to present a holistic understanding of students' cognitive abilities and affective perceptions, contributing valuable insights to curriculum enhancement and instructional planning in higher education mathematics.

4. Results and Discussion

Table 1. Reading Materials Available at Home.

Reading Materials	f	Rank
Mathematics Videos/DVD tutorials	18	6
Practice Workbooks/Problem Solving Guides	29	3
Basic Mathematics Books	28	4
Online Resources	35	2
Advanced Mathematics Books	27	5
Magazines	5	7
None	123	1

The data in Table 1 reveals a striking reality about the reading materials available at home to support mathematics learning. The majority of students (123) out of the total respondents reported having no math-related reading materials at home, making this the highest-ranking response. This lack of access to resources may significantly hinder students' ability to reinforce their learning outside the classroom. Among those who do have materials, online resources were the second most common (35 respondents), reflecting the growing reliance on digital platforms for supplemental learning. Practice workbooks or problem-solving guides (29) and basic mathematics books (28) followed closely, suggesting that some students still turn to traditional print materials to enhance their skills. Interestingly, advanced mathematics books (27) and video or DVD tutorials (18) were less common, possibly indicating that more complex or multimedia resources are either less accessible or less prioritized at home. Magazines were the least cited, with only five respondents mentioning them, which may suggest they are not widely recognized as helpful for math learning. Overall, the data emphasizes a pressing need to improve students' access to diverse and engaging math resources at home to support academic success.

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Table 2. Time Spent Studying Math Per Week.

Time Spent (In Hours)	f	%
6-May	2	0.83
4-Mar	40	16.6
2-Jan	199	82.57
Total	241	100

Table 2 shows that the vast majority of students 199 out of 241, or 82.57% spend only 1 to 2 hours per week studying mathematics. This limited time commitment suggests that math may not be receiving sufficient attention outside of the classroom, which could impact students' understanding and performance in the subject. A smaller group, 40 students (16.60%), reported studying for 3 to 4 hours weekly, while only 2 students (0.83%) dedicated 5 to 6 hours, highlighting how rare extended math study is among the group. These findings raise important concerns about students' study habits and time management, particularly in a subject that often requires consistent practice to build proficiency. Encouraging students to increase their study time, even by a small amount could make a meaningful difference in their confidence and performance in mathematics.

Table 3. Level of attitudes of the respondents in learning Mathematics in terms of self-confidence.

S/N	Indicators	WM	SD	Verbal Description
1	Mathematics is one of my most dreaded subjects.	3.15	0.88	Neutral
2	My mind goes blank and I am unable to think	2.97	0.79	Neutral
3 .	Studying mathematics makes me feel nervous	3.07	0.85	Neutral
4	Mathematics makes me feel uncomfortable.	2.78	0.85	Neutral
5	I am always under a terrible strain in a math	2.81	0.76	Neutral
6	When I hear the word mathematics, I have a	2.71	0.95	Neutral
7	It makes me nervous to even think about	2.95	0.87	Neutral
8	Mathematics does not scare me at all.	2.89	0.92	Neutral
9 .	I expect to do fairly well in any math class I take	3.17	0.79	Neutral
10 .	I am always confused in my mathematics class	3.11	0.88	Neutral
11	I have a lot of self-confidence when it comes to	2.95	0.96	Neutral
12	I am able to solve mathematics problems	2.81	0.9	Neutral
13	I feel a sense of insecurity when attempting	2.91	0.81	Neutral
14 .	I learn mathematics easily	2.81	0.89	Neutral
15 .	I believe I am good at solving math problems	2.88	0.91	Neutral
		2.93	0.87	Nuetral

The results in Table 3 present a consistent trend: respondents generally expressed a neutral attitude toward self-confidence in learning mathematics. Across all 15 statements, the mean scores ranged from 2.71 to 3.17, with standard deviations indicating moderate variability in responses. For instance, many students neither strongly agreed nor disagreed with statements expressing nervousness or dread such as "Mathematics is one of my most dreaded subjects" (M=3.15, SD=0.88) and "Studying mathematics makes me feel nervous" (M=3.07, SD=0.85). Similarly, statements that reflect positive self-perception, like "I expect to do fairly well in any math class I take" (M=3.17, SD=0.79), still hovered in the neutral range. This neutrality suggests a lack of strong emotional engagement, whether positive or negative, in students' self-confidence regarding math. While it is encouraging that there is no overwhelming negativity, the absence of confidence or positive affirmation also highlights an opportunity: students may benefit from instructional strategies and support systems that aim to boost self-belief, reduce anxiety, and build competence through positive reinforcement and active engagement. In sum, this neutral stance underlines the importance of addressing not just content delivery, but also the emotional and psychological factors influencing students' learning experiences in mathematics.

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Table 4. Level of attitudes of the respondents in learning Mathematics in terms of Value

S/N	Indicators	WM	SD	Verbal Desc.
1	Mathematics is very worthwhile and necessary	3.63	0.91	Positive
2	I want to develop my mathematical skills	4.10	0.94	Positive
3	Mathematics helps develop the mind and teachers to think.	4.02	0.86	Positive
4	Mathematics is important in everyday life.	4.27	0.97	Very Positive
5	Mathematics is one of the most important subjects for people to study.	4.10	0.93	Positive
6	High school math courses would be very helpful	3.84	0.94	Positive
7	I can think of many ways that I use math outside	3.68	0.97	Positive
8	I think studying advanced mathematics is useful	3.87	1.05	Positive
9	I believe studying math helps me with problem solving in other areas.	3.88	0.96	Positive
10	A strong math background could help me in my professional life.	3.85	0.94	Positive
	Aggregate Weighted Mean	3.92		Positive
	Aggregate Standard Deviation		0.95	

The data in Table 4 illustrates that respondents hold a generally positive attitude toward the value of mathematics. The aggregate weighted mean of 3.92 with a standard deviation of 0.95 suggests a shared belief among students in the importance and usefulness of mathematics in both academic and real-life contexts. The strongest agreement came from the statement "Mathematics is important in everyday life" (M=4.27, SD=0.97), which received a "Very Positive" rating, indicating widespread recognition of math's practical applications. Similarly, students highly endorsed the ideas that math develops thinking skills (M=4.02) and that it is essential for professional success (M=3.85), reflecting an appreciation of its role in cognitive growth and career readiness. Across all ten indicators, students consistently expressed positive or very positive perceptions, with no negative or neutral responses. This suggests that while students may experience doubt about their own confidence or ability in math they still acknowledge and respect its value.

Table 5. Level of attitudes of the respondents in learning Mathematics in terms of Enjoyment

S/N	Indicators	WM	SD	Verbal Desc.
1	I get a great deal of satisfaction out of solving a mathematical problem.	3.28	0.75	Neutral
2	I have usually enjoyed studying mathematics in school.	3.29	0.80	Neutral
3	Mathematics is dull and boring.	2.55	0.99	Negative
4	I like to solve new problems in mathematics	3.26	0.82	Neutral
5	I would prefer to do an assignment in Math than to write an essay.	3.10	0.92	Neutral
6	I really like in mathematics.	3.24	0.86	Neutral
7	I am happier in a mathematics class that in any other classes.	3.15	0.83	Neutral
8	Mathematics is a very interesting subject.	3.51	0.85	Positive
9	I am comfortable expressing my own ideas on how to look for solutions to a difficult problem in Math,	3.15	0.75	Neutral
10	I am comfortable answering questions in Math.	3.14	0.78	Neutral
	Aggregate Weighted Mean	3.17		Neutral
	Aggregate Standard Deviation		0.84	

Table 5 reveals that respondents generally maintain a neutral attitude toward enjoyment in learning mathematics, with an aggregate weighted mean of 3.17 and a standard deviation of 0.84. Most of the individual statements, such as "I get a great deal of satisfaction out of solving a mathematical problem" (M=3.28) and "I like to solve new problems in mathematics" (M=3.26), received neutral ratings, indicating that while students don't dislike math, they also don't find it particularly enjoyable. Notably, only one statement "Mathematics is a very interesting subject" earned a positive rating (M=3.51), suggesting that some students do find the subject engaging. Conversely, the statement "Mathematics is dull and boring" had the lowest mean score (M=2.55), earning a negative rating, which signals that at least a portion of students find

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the subject unappealing or monotonous. These results suggest that while students recognize the importance of mathematics many do not yet find joy or deep interest in learning it.

Table 6. Level of attitudes of the respondents in learning Mathematics in terms of Motivation.

S/N	Indicators	WM	SD	Verbal Desc.
1	I am confident that I could learn advanced mathematics	3.35	0.93	Neutral
2	I would like to avoid using mathematics in college.	2.90	1.05	Neutral
3	I am willing to take more than the required amount of mathematics.	3.24	0.82	Neutral
4	I plan to take as much mathematics as I can during my education.	3.27	0.82	Neutral
5	The challenge of math appeals to me.	3.44	0.87	Positive
	Aggregate Weighted Mean	3.24		Neutral
	Aggregate Standard Deviation		0.90	

Table 6 shows that respondents generally hold a neutral attitude toward motivation in learning mathematics, as reflected by the aggregate weighted mean of 3.24 and a standard deviation of 0.90. Most items received neutral ratings, such as "I am confident that I could learn advanced mathematics" (M=3.35) and "I plan to take as much mathematics as I can during my education" (M=3.27), suggesting that while students are not entirely disinterested, they are also not strongly driven to pursue mathematics beyond the required curriculum. Interestingly, the only item to receive a positive rating was "The challenge of math appeals to me" (M=3.44), indicating that some students do find motivation in the intellectual rigor of the subject. On the other hand, the statement "I would like to avoid using mathematics in college" scored the lowest (M=2.90), though it still fell within the neutral range. This reflects a mild reluctance among some students to engage with math beyond basic requirements, rather than outright avoidance.

Table 7. Level of performance of mathematics proficiency of the respondents.

Level	Numerical Range	F	%
Advanced	33-40	0	0.00
Proficient	25-32	32	13.28
Approaching Proficiency	17-24	111	46.06
Developing	9-16	94	39.00
Beginning	0-8	4	1.66
Total		241	100.00
Mean		18.10	
St. Dev.		5.16	

Table 7 presents the overall performance levels of respondents in mathematics proficiency, revealing that a large majority are performing below the proficient level. The most common category was Approaching Proficiency, with 111 students (46.06%), followed closely by Developing, which accounted for 94 students (39.00%). Only 32 students (13.28%) reached the Proficient level, and no students scored in the Advanced range. Additionally, a small portion (4) students (1.66%) fell into the Beginning level, indicating minimal understanding of the assessed concepts. The mean score of 18.10 (out of 40), with a standard deviation of 5.16, suggests that most students scored within the lower-middle performance band, just below the cutoff for proficiency. These results highlight a significant concern: over 85% of students are not yet demonstrating proficient-level mastery of mathematical concepts. This trend points to the need for targeted instructional interventions, particularly focusing on foundational skills and conceptual understanding.

Table 8. Test of Difference on the respondents' attitudes when grouped by the program enrolled.

Source of Variation	Sum of Squares	df	Mean Square	F-value	p-value	Remarks
Between Groups	1561.967	2	780.983	38.544*	0.000	Significant
Within Groups	4822.44	238	20.262			
Total	6384.407	240				

Note: *Significant at p<0.05.

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Table 8 presents the results of a one-way ANOVA test examining whether there are significant differences in students' attitudes toward mathematics based on their academic program. The analysis shows a statistically significant difference among the groups, as indicated by the F-value of 38.544 and a p-value of 0.000, which is well below the threshold of 0.05. This result implies that the academic program a student is enrolled in significantly influences their attitude toward mathematics. In other words, students from different programs (e.g., BS Communication, BS Biology, BS Psychology) do not share the same attitudes toward learning math some groups likely have more positive or more negative dispositions than others. This could be due to differences in curriculum emphasis, perceived relevance of math to their field, or prior experiences in math education. These findings suggest that program-specific interventions may be effective in addressing attitudinal challenges and tailoring instructional strategies to better meet the needs and perceptions of students in each discipline.

Table 9. Test of Difference on the mathematics proficiency when grouped by the program enrolled.

Source of Variation	Sum of Squares	df	Mean Square	F-value	p-value	Remarks
Between Groups	.465	2	.233	2.027	0.134	Not Significant
Within Groups	27.329	238	.115			
Total	27.794	240				

Note: *Significant at p<0.05.

Table 9 displays the results of a one-way ANOVA examining whether there are significant differences in mathematics proficiency among students from different academic programs. The F-value of 2.027 and a p-value of 0.134 indicate that the result is not statistically significant, as the p-value exceeds the standard threshold of 0.05. This means that students' performance in mathematics proficiency does not significantly differ based on their program of study (e.g., BS Communication, BS Biology, BS Psychology). Despite the attitudinal differences reported in Table 8, students across programs appear to perform similarly in terms of mathematical ability. This finding suggests that factors other than academic program such as prior math background, teaching strategies, or personal study habits may have a greater influence on proficiency. It also emphasizes that while students may feel differently about math depending on their program, their actual performance levels are more uniform across disciplines.

5. Discussion

The findings from this study align with broader research emphasizing the significant role of student attitudes in shaping mathematics performance. Although the results showed no significant difference in actual mathematics proficiency across academic programs, students' attitudes toward mathematics varied significantly depending on their field of study. This suggests that while students may perform similarly, their emotional and psychological engagement with mathematics differs. Research by Cerbito (2020) supports this, indicating that while many students value mathematics, they often struggle with confidence, motivation, and enjoyment factors that are closely linked to proficiency levels (Kaur & Prendergast, 2022). These affective factors particularly value and enjoyment, are critical in motivating students to invest time and effort into studying math, which can ultimately lead to better outcomes. Further supporting this is the study by Clyde et al. (2022), which found that student attitude was a stronger predictor of mathematics skill development than self-regulated learning practices in online education settings (Ozdal et al., 2022). The current study's finding that most students spend only 1–2 hours per week studying math, combined with a general neutrality in self-confidence and enjoyment, mirrors Clyde's conclusion: attitude not just study habits drive meaningful learning in mathematics. This reinforces the call for educational strategies that go beyond content delivery to include motivational supports, real-life application, and emotional engagement. Addressing these psychological components may be the key to unlocking higher levels of mathematics proficiency across disciplines.

6. Conclusion

Based on the findings, it is evident that students generally hold a neutral attitude toward mathematics in terms of self-confidence, motivation, and enjoyment, although they positively recognize its value in daily life

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and future careers. While attitudes toward mathematics significantly differed by academic program, actual proficiency levels remained statistically similar across disciplines. The majority of students are performing below the proficient level and spend minimal time studying math, which may hinder their progress. These results emphasize the critical need for educational interventions that enhance not just content mastery but also students' emotional and motivational engagement with mathematics to foster long-term academic success and confidence in the subject.

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