



FOSTERING PROBLEM – SOLVING COMPETENCE: EXPLORING THE IMPACT OF ATTITUDES, CONFIDENCE, AND ACADEMIC STRUGGLES

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ABSTRACT

Mathematics plays a fundamental role in developing learners' logical reasoning, critical thinking, and problem-solving abilities; yet many junior high school students continue to struggle with mathematical problem solving due to a complex interplay of affective and cognitive factors. This study examined the attitudes toward mathematical problem solving, the extent of confidence in learning problem solving, and the challenges encountered by Grade 7 students in selected public and private secondary schools in the municipality of Tago, Surigao del Sur during School Year 2025–2026. It further determined significant differences in attitudes and confidence by school type and identified which profile and confidence domains significantly predicted students' attitude toward problem solving. The study employed a descriptive-correlational research design involving 261 Grade 7 respondents. Data were collected using a researcher-made questionnaire and analyzed through mean, standard deviation, independent samples t-test, multiple regression analysis, and thematic analysis. Findings revealed that students manifested a Strong Liking in terms of positive attitude and Little Negativity in negative attitude. Confidence across all four domains was rated to a Great Extent, with Commitment and Persistence as the highest and Stability of Confidence as the lowest indicator. Thematic analysis identified five challenge areas, with Conceptual Difficulty in Algebra as the most prominent. Highly significant differences in attitudes and use of effective problem-solving strategies were found between school types. The regression model significantly predicted students' attitude, and Stability of Confidence emerged as the only statistically significant individual predictor. Based on these findings, the Mathematics Confidence and Problem-Solving Enhancement Program (MCPS-EP) was proposed as a targeted, evidence-based instructional intervention.

Keywords: *Mathematical Problem Solving, Student Attitude, Mathematical Confidence, Academic struggles, Grade 7 Learners, Intervention Program, Stability of Confidence*

INTRODUCTION

Mathematics is a foundational subject that equips learners with essential skills in logical reasoning, critical thinking, and problem-solving, yet many students begin to struggle with it precisely when these skills matter most. This study explored the problem-solving competence of Grade 7 learners, focusing on how their attitudes toward mathematics, their confidence in solving problems, and the academic struggles they encounter collectively shape their performance. Grade 7 is a critical transition point, as learners move from the concrete arithmetic of elementary school to the more abstract and complex concepts of secondary mathematics. During this period, many students experience a shift in attitude, a decline in confidence, and the emergence of learning difficulties that affect not only their academic performance but also their long-term engagement with the subject. These affective and cognitive factors were examined together rather than in isolation, so that the study could generate a comprehensive understanding of Grade 7 learners' problem-solving competence and inform instructional improvements and a targeted intervention program.

Recent studies emphasize that problem-solving competence is an essential skill for academic success and lifelong learning, particularly in the context of mathematics education (Zhang et al., 2025). Research underscores that students who possess strong problem-solving abilities demonstrate greater confidence, persistence, and creativity in addressing complex challenges (Amanda et al., 2024; Alniak-Daye & Ogan-Bekiroglu, 2025). However, fostering such competence requires more than content mastery, it calls for instructional approaches that integrate critical thinking, collaborative engagement, and authentic application of knowledge (Tan et al., 2024). The integration of innovative learning strategies, such as interdisciplinary thematic learning, conversational agent technology, and STEM-based tasks, has been shown to positively influence students' attitudes, engagement, and performance in mathematics, thereby enhancing their overall problem-solving skills (Alniak-Daye & Ogan-Bekiroglu, 2025; Zhang et al., 2025).

In the Philippine context, persistent difficulties in mathematics remain evident among learners at the junior secondary level. The 2022 Programme for International Student Assessment revealed that the majority of Filipino learners failed to reach the minimum proficiency benchmark in mathematics (OECD, 2023), a concern echoed locally in Tago District, Schools Division of Surigao del Sur, where the Mean Percentage Score in mathematics from 2022 to 2025 averaged only 51.86%, far below the 75% target (Department of Education – Surigao del Sur Division, 2025). In the municipality of Tago specifically, Grade 7 students have consistently struggled with algebraic tasks, mathematical word problems, and formula retention (Jatileni & Neshila, 2024; Recanil & Quirante, 2025). Beyond these cognitive difficulties, many learners have expressed frustration, low confidence, and a tendency to disengage when confronted with

challenging problems, relying heavily on teacher assistance before attempting any solution (Campanilla, 2024; Cerbito, 2020; Cullano, 2024; Escarez & Ching, 2022). Despite existing studies on attitudes and self-efficacy in Philippine mathematics education, there remains limited localized research that simultaneously examines how attitudes, confidence, and academic struggles collectively influence problem-solving competence among Grade 7 learners, a gap that the present study sought to address.

This study aimed to address that gap by providing an evidence-based understanding of how students' attitudes, confidence, and academic struggles interact to influence problem-solving competence. By focusing on a specific learning context and applying a structured quantitative approach, it generated actionable insights for educators, curriculum developers, and policymakers in designing interventions that strengthen students' mathematical problem-solving skills. Furthermore, the study sought to bridge global research perspectives with localized realities, contributing to instructional practices that support both the cognitive and affective dimensions of mathematics learning.

Research Questions

1. What is the profile of the Grade 7 students in terms of:
 - 1.1. Age;
 - 1.2. Gender; and
 - 1.3. Type of school (public/private)?
2. What is the level of students' attitude towards problem solving in mathematics in terms of:
 - 2.1. Positive Attitude; and
 - 2.2. Negative Attitude?
3. What is the extent of students' confidence in learning problem solving in mathematics in terms:
 - 3.1. Belief in Ability to Solve;
 - 3.2. Stability of Confidence;
 - 3.3. Commitment and Persistence; and
 - 3.4. Use of Effective Problem-Solving Strategy
4. What are the challenges encountered by students in problem solving?
5. Is there a significant difference between the students' attitude and confidence in problem solving when grouped according to the type of school?
6. Which among the domains of students' profile and confidence greatly affects their attitude toward problem solving?
7. What intervention program can be proposed based on the results of the study?

METHODOLOGY

Research Design

A descriptive-correlational design guided this investigation as it investigated the profile, mathematics attitudes, confidence, and problem-solving struggles of Grade 7

learners. Through its descriptive aspect, the study reported the learners' background according to age, gender, and school type, together with how favorable their attitudes were, how strong their confidence stood, and what difficulties they met. Its correlational aspect, meanwhile, tested whether attitudes and confidence varied meaningfully between school types and identified which profile and confidence domains significantly predicted students' attitude toward problem solving. Such a design suited the study, which aimed to portray the learners' traits, dispositions, and experiences and to trace how the variables related to one another without asserting cause and effect.

Locale and Respondents

The study was conducted in chosen public and private secondary schools in the municipality of Tago, Surigao del Sur. The public schools comprised Gamut National High School, Purisima National High School, Badong National High School, and Clarence T. Pimentel National High School, while Purisima Diocesan School Inc. represented the private sector.

Participating in the study were Grade 7 learners enrolled for School Year 2025–2026 in the selected public and private secondary schools. Across these institutions, the Grade 7 enrollment reached 747 learners, from which a sample of 261 respondents was determined. The respondents' demographic characteristics in terms of age, gender, and school type are presented in the Results section.

Sampling Procedure

The sample of 261 was computed through Slovin's formula using a 5% margin of error. Stratified random sampling was applied, treating the five schools as strata so that the learners' natural grouping by institution and school type would be preserved. Each stratum received a share of the sample proportional to its size within the total population. Respondents in every stratum were then drawn at random from class lists, so that each Grade 7 learner had an equal likelihood of being chosen. This procedure secured representation of the different schools and both public and private sectors.

Research Instrument

A researcher-made questionnaire served as the study's principal instrument. It was crafted to match the conceptual framework, statement of the problem, and reviewed literature. The questionnaire was prepared in both English and Tagalog versions to support learner comprehension.

The questionnaire consisted of four parts. Part I gathered background details, namely age, gender, and school type. Part II measured attitudes toward mathematical problem solving, divided into positive and negative attitudes, with ten statements for each. Part III measured confidence in problem solving across four indicators—belief in one's ability to solve, stability of confidence, commitment and persistence, and use of effective problem-solving strategies with ten statements for each indicator. Part IV contained four open-

ended, non-judgmental prompts concerning the difficulties encountered in problem solving. Parts II and III used a five-point Likert scale ranging from 5 (To a Very Great Extent / Strongly Agree) to 1 (To a Very Small Extent / Strongly Disagree), depending on the construct measured.

Three specialists in mathematics education, educational measurement, and research conducted the face and content validation of the questionnaire. The validators were required to hold at least a master's degree in education or a cognate field, have no fewer than three years of teaching or research experience, and be conversant with instrument construction and validation. They examined the items for clarity, relevance, cultural fit, consistency with the study's aims, and alignment with Department of Education curriculum standards. Their recommended refinements were applied before pilot testing.

The validated questionnaire was pilot tested with a small group of Grade 7 learners from Tago District, Surigao del Sur to assess the clarity of instructions, suitability of the items, and workability of administration. Reliability was measured using Cronbach's alpha, with 0.70 set as the minimum acceptable level of internal consistency. The coefficients were $\alpha = 0.864$ for Positive Attitude, $\alpha = 0.805$ for Belief in Ability to Solve, $\alpha = 0.853$ for Stability of Confidence, $\alpha = 0.849$ for Commitment and Persistence, and $\alpha = 0.844$ for Use of Effective Problem-Solving Strategies.

Data Gathering Procedure

The researcher obtained written clearance to carry out the study from the Schools Division Superintendent of the Department of Education in Surigao del Sur. Once this was granted, individual letters were sent to the principals of the selected public and private secondary schools in Tago seeking permission to administer the survey. The Grade 7 mathematics teachers and class advisers were oriented regarding the study's purpose and questionnaire administration. Parental consent forms were distributed to prospective participants, and only learners who returned forms signed by a parent or guardian took part in the study.

The questionnaire, offered in both English and Tagalog, was administered face to face inside the classroom during hours that would not disrupt lessons. The researcher provided clear directions and remained available to address questions without influencing the learners' responses. Ample time was allotted for the learners to answer independently and anonymously. Each completed questionnaire was retrieved immediately. After data collection, the researcher sorted, tabulated, and prepared the responses for analysis while maintaining confidentiality and secure handling of the records.

Data Analysis

The quantitative data underwent descriptive and inferential statistical treatment. Frequency and percentage were used to describe the respondents' background in terms of age, gender, and school type and to summarize the reported difficulties. Mean and standard deviation were used to determine the learners' attitudes toward mathematical

problem solving and their confidence across the identified domains. An independent-samples t-test was used to determine whether attitudes and confidence differed significantly when learners were grouped according to school type. Multiple regression analysis was used to identify which profile and confidence domains significantly predicted students' attitude toward mathematical problem solving.

For the qualitative data, thematic analysis was applied to the open-ended responses. The analysis followed Braun and Clarke's (2006) six-phase framework: becoming familiar with the data; forming initial codes; searching for themes; reviewing themes; defining and naming themes; and producing the report. The final themes were conceptual difficulty in algebra, weakness in basic mathematical operations, trouble understanding mathematical problems, limited retention of formulas and procedures, and reliance on teacher and peer assistance.

Scope and Limitations

The study focused on Grade 7 learners from the five selected secondary schools in Tago, Surigao del Sur during School Year 2025–2026. It examined learners' profiles, attitudes toward mathematical problem solving, confidence in solving mathematical problems, reported difficulties, differences according to school type, and profile and confidence domains that predict students' attitude toward mathematical problem solving.

The study was limited to the selected Grade 7 learners and therefore its findings are context-specific. The investigation used a descriptive-correlational design; consequently, relationships and statistical predictors identified in the study should not be interpreted as evidence of causal relationships. The qualitative findings were based on the learners' written responses to the open-ended prompts, while the quantitative measures were based on self-reported ratings. These conditions should be considered when interpreting and applying the findings.

RESULTS

Profile of Grade 7 Students

Table 1. Profile of the Grade 7 Students

Indicator	Category	Frequency	Percent (%)
Age	12	109	41.80
	13	140	53.60
	14	11	4.20
	15	1	0.40
Gender	Female	152	58.24
	Male	109	41.76
Type of School	Private	20	7.66
	Public	241	92.34

The highest frequencies reveal that most respondents are thirteen years old, female, and enrolled in public schools. Conversely, the lowest frequencies show that learners aged fourteen to fifteen, male students, and private school enrollees constitute the smallest portions of the sample.

Level of Student Attitudes Toward Problem Solving in Mathematics

Table 2. Level of Students' Attitude Towards Problem Solving in Mathematics

Indicators	Mean	Adjectival Rating	Interpretation
Positive Attitude			
1. I feel excited when I am given a new math problem to solve.	3.46	Agree	Strong Liking
2. I like discovering different ways to arrive at a correct answer.	4.05	Agree	Strong Liking
3. I see problem-solving as a challenge that makes learning interesting.	3.854	Agree	Strong Liking
4. I find satisfaction in helping classmates solve difficult problems.	4.05	Agree	Strong Liking
5. I believe practicing problem-solving improves my thinking skills.	4.257	Strongly Agree	Very Strong Liking
6. I enjoy working on math problems even if they take time to solve.	3.556	Agree	Strong Liking
7. I feel proud when I successfully solve a difficult math problem.	3.985	Agree	Strong Liking
8. I look forward to learning new problem-solving techniques in math.	4.008	Agree	Strong Liking
9. I believe that solving math problems will be useful in real life.	4.441	Strongly Agree	Very Strong Liking
10. I feel motivated to challenge myself with harder math problems.	3.464	Agree	Strong Liking
Overall Mean	3.913	Agree	Strong Liking
Negative Attitude			
1. I lose interest when a problem requires too many steps to solve.	2.862	Neutral	Mixed Feeling
2. I think solving math problems is a waste of time and effort.	2.249	Disagree	Little Negativity
3. I avoid solving problems that seem too complicated.	2.609	Neutral	Mixed Feeling
4. I feel unmotivated to work on math problems during free time.	2.582	Neutral	Mixed Feeling

5. I believe solving math problems is not useful for my future plans.	2.157	Disagree	Little Negativity
6. I feel bored whenever the teacher gives problem-solving activities.	2.414	Disagree	Little Negativity
7. I get easily frustrated when I cannot solve a problem quickly.	3.004	Neutral	Mixed Feeling
8. I would rather copy answers than spend time solving problems on my own.	1.881	Disagree	Little Negativity
9. I feel like giving up whenever I see long or wordy math problems.	2.257	Disagree	Little Negativity
10. I think math problem solving is only for “smart” students, not for me.	2.203	Disagree	Little Negativity
Overall Mean	2.422	Disagree	Little Negativity

The highest-rated indicator is the students' belief that solving math problems will be useful in real life, which earned a rating of Strongly Agree, interpreted as Very Strong Liking.

On the other hand, the lowest-rated indicator in the entire table is the preference to copy answers rather than solve problems independently, which received a rating of Disagree, interpreted as Little Negativity. Meanwhile, the item on getting easily frustrated when unable to solve a problem quickly obtained a Neutral rating, interpreted as Mixed Feeling, the highest among the negative indicators, and the items on losing interest in many-step problems and avoiding complicated ones likewise registered Mixed Feeling.

Taken as a whole, the overall mean for Positive Attitude corresponds to Agree, interpreted as Strong Liking, while the overall mean for Negative Attitude corresponds to Disagree, interpreted as Little Negativity.

Extent of Students' Confidence in Learning Problem Solving in Mathematics

Table 3. Extent of Students' Confidence in Learning Problem Solving in Mathematics

Indicators	Mean	Adjectival Rating
Belief in Ability to Solve	3.563	To a Great Extent
Stability of Confidence	3.456	To a Great Extent
Commitment and Persistence	3.781	To a Great Extent

Use of Effective Problem-Solving Strategy	3.585	To a Great Extent
Overall Mean	3.596	To a Great Extent

Legend: 4.21–5.00 = To a Very Great Extent (TVGE); 3.41–4.20 = To a Great Extent (TGE); 2.61–3.40 = To a Moderate Extent (TME); 1.81–2.60 = To a Small Extent (TSE); 1.00–1.80 = Not at All (NAA)

The findings indicate that students demonstrate a generally high level of confidence in learning problem solving in mathematics. In contrast, stability of confidence registered the lowest level among the indicators, although it still reflects a favorable extent of confidence among students.

Challenges Encountered by Students in Problem Solving

To gain a deeper understanding of the learners' experiences, responses to the open-ended questions were analyzed using thematic analysis to identify the recurring difficulties encountered in mathematical problem solving. The analysis generated five major themes, namely: conceptual difficulty in algebra, weakness in basic mathematical operations, difficulty in understanding mathematical problems, limited retention of formulas and procedures, and dependence on teacher and peer assistance. These themes reflect the actual struggles experienced by the learners during mathematics classes and problem-solving activities. The thematic presentation is shown in Table 4.

Table 4. Themes on the Challenges Encountered by Students in Problem Solving

Themes	Sub-themes
Conceptual Difficulty in Algebra	Difficulty in algebraic expressions, variables, equations, and polynomials
Weakness in Basic Mathematical Operations	Difficulty in fractions, multiplication, division, and large numbers
Difficulty in Understanding Mathematical Problems	Confusion in interpreting questions, instructions, and mathematical language
Limited Retention of Formulas and Procedures	Forgetting formulas, solution steps, and mathematical processes
Dependence on Teacher and Peer Assistance	Seeking guidance, validation, and explanation from others

Theme 1. Conceptual Difficulty in Algebra

One of the most evident themes that emerged from the responses was conceptual difficulty in algebra. Most of the learners expressed confusion in dealing with algebraic expressions, variables, equations, and polynomial concepts. The learners associated algebra with abstract symbols and complicated rules, which caused difficulty in understanding and solving mathematical problems.

“Ang Math algebraic expression kay ang algebraic expression sagud kay puro letters and numbers so mao to ang nagpalibog sa ako.” (Algebraic expressions are difficult because they contain letters and numbers, and that is what confuses me.) – **Key Informant 2**

“Nalisodan ako sa akong problem ana variable, constant, algebraic expression og gram.” (I find problems involving variables, constants, algebraic expressions, and graphs difficult.) - **Key Informant 5**

“Sa equation kay usahay dili nako mahibal-an unsaon pag solve.”
“In equations, there are times when I do not know how to solve them.” - **Key Informant 9**

“Polynomial fraction kay ang polynomial fraction polynomial ba o dili.”
(Polynomial fractions confuse me because I do not know whether they are polynomial or not.) - **Key Informant 11**

“Ang algebra kay lisod kay daghan kaayo og rules.” (Algebra is difficult because there are too many rules.) - **Key Informant 14**

Theme 2. Weakness in Basic Mathematical Operations

Another major challenge experienced by the learners involved weakness in basic mathematical operations such as multiplication, division, fractions, and operations involving large numbers. Several respondents admitted that they become confused whenever basic operations are integrated into algebraic problems.

“Ang mga dako na number og divide og time tapos may algebra.” (Large numbers involving division, multiplication, and algebra are difficult.) - **Key Informant 3**

“Sa fractions ko pirmi masayop.” (I always make mistakes in fractions.) - **Key Informant 6**

“Kung naay division kay maglibog na ko.” (Whenever there is division, I become confused.) - **Key Informant 8**

“Dili ko paspas sa multiplication mao usahay dili nako mahuman.” (I am slow in multiplication, so sometimes I cannot finish.) - **Key Informant 10**

“Lisod kung daghan na og numbers kay magkamali ko.” (It becomes difficult when there are many numbers because I make mistakes.) - **Key Informant 12**

Theme 3. Difficulty in Understanding Mathematical Problems

Another recurring challenge among the learners was difficulty in understanding mathematical questions, instructions, and discussions. Some students shared that despite listening carefully during discussions, they still could not fully understand the lesson or the problem being presented.

“Usahay dili ko kasabot sa pag discuss nimo maam.” (Sometimes I cannot understand your discussion, Ma’am.) - **Key Informant 4**

“Ang Math kay bisan unsaon nako pagpamati dili gihapon ako kasabot kay ang math libog sa ako.” (Even if I listen carefully, I still cannot understand Math because it is confusing for me.) - **Key Informant 7**

“Malibog ko sa instruction sa problem.” (I become confused with the instructions in the problem.) - **Key Informant 13**

“Dili nako masabtan unsa ang gipangayo sa question.” (I cannot understand what the question is asking.) - **Key Informant 15**

“Sa word problem ko lisod kay daghan basahon.” (I struggle in word problems because there is too much to read.) - **Key Informant 16**

Theme 4. Limited Retention of Formulas and Procedures

The learners also expressed difficulty in remembering formulas, procedures, and solution steps. This challenge caused hesitation and uncertainty whenever they encountered unfamiliar mathematical problems.

“Yong kanyang formula madali lang ako makalimutan.” (I easily forget the formula.) - **Key Informant 1**

“Usahay kabalo ko pero makalimot ko sa process.” (Sometimes I know it, but I forget the process.) - **Key Informant 6**

“Dili nako mahinumduman ang steps.” (I cannot remember the steps.) - **Key Informant 9**

“Kung daghan formula malibog ko.” (I become confused when there are many formulas.) - **Key Informant 11**

“Makalimot ko unsaon pagsugod.” (I forget how to start solving.) - **Key Informant 17**

Theme 5. Dependence on Teacher and Peer Assistance

The learners also revealed that they frequently depend on teachers and classmates whenever they encounter difficulties in solving mathematical problems.

“Mangutana ko kay teacher kung amo ba ini o dili or sa klasemate.” (I ask the teacher or my classmates whether it is correct or not.) - **Key Informant 3**

“Magpatudlo sa teacher para dili masayop.” (I ask the teacher to teach me so I will not make mistakes.) - **Key Informant 5**

“Masabtan ra nako kung naay mutudlo.” (I only understand when someone teaches me.) - **Key Informant 8**

“Mangutana ko kay basin mali akong solution.” (I ask because my solution might be wrong.) - **Key Informant 10**

“Kailangan nako og guide para makasolve.” (I need guidance to solve the problem.) - **Key Informant 14**

Significant Difference Between the Students’ Attitude and Confidence in Problem Solving When Grouped According to School Type

Table 5. Significant Difference Between the Students’ Attitude and Confidence in Problem Solving When Grouped According to School Type

Sources of Variation	Computed t	P-value	Decision	Conclusion
Positive Attitude	5.830	0.000	Reject Ho	Highly Significant
Negative Attitude	14.700	0.000	Reject Ho	Highly Significant
Belief in Ability to Solve	0.170	0.869	Failed to Reject Ho	Not Significant
Stability of Confidence	1.300	0.197	Failed to Reject Ho	Not Significant
Commitment and Persistence	1.790	0.075	Failed to Reject Ho	Not Significant
Use of Effective Problem-Solving Strategy	4.010	0.000	Reject Ho	Highly Significant

Table 5 presents the test of significant difference between the students' attitude and confidence in problem solving when grouped according to school type. The comparison includes indicators of attitude such as positive and negative attitudes, as well as indicators of confidence including belief in ability to solve, stability of confidence, commitment and persistence, and the use of effective problem-solving strategies. As shown in the table, the computed t-values for positive attitude, negative attitude, and use of effective problem-solving strategy were all significant at the 0.05 level, leading to the rejection of the null hypothesis for these domains.

Domains of Profiles and Confidence that Greatly Affect Students' Attitude Toward Problem Solving

Table 6. Domains of Profile and Confidence Greatly Affects Students' Attitude

Predictors	Coefficient	t-value	P-value	Decision
Age	0.0168	0.430	0.668	Not Significant
Sex	0.0599	1.290	0.199	Not Significant
Type of School	0.763	1.200	0.230	Not Significant
Belief in Ability to Solve	0.0648	1.280	0.202	Not Significant
Stability of Confidence	0.1299	2.470	0.014	Significant
Commitment and Persistence	0.0226	0.460	0.647	Not Significant
Use of Effective Problem-Solving Strategy	0.0338	0.590	0.556	Not Significant
S=0.5036	R-Sq=7.7%	R-Sq(adj)=6.4%		
Analysis of Variance				
Source	SS	MS	F	P-value
Regression	10.4473	1.4925	5.89	0.000
Residual Error	125.0212	0.2536		
TOTAL	135.4685			

As reflected in Table 6, stability of confidence obtained the highest result among the predictors and emerged as the only significant domain affecting students' attitude toward problem solving.

DISCUSSION

Profile of Grade 7 Students

The highest frequencies reveal that most respondents are thirteen years old, female, and enrolled in public schools. The dominance of thirteen-year-olds indicates that the respondents are within the age normally expected of Grade 7 learners, meaning most progressed through elementary school without delay or repetition and are at the developmental stage where abstract reasoning begins to mature. The larger share of female respondents and the overwhelming representation of public school learners reflect the enrollment realities of the locality, where public institutions absorb the vast majority of the student population. These patterns imply that the study's findings largely portray the experience of developmentally on-track learners in the public school setting, the very context where instructional resources are most stretched and where interventions are most needed.

Conversely, the lowest frequencies show that learners aged fourteen to fifteen, male students, and private school enrollees constitute the smallest portions of the sample. The scarcity of overage learners suggests minimal grade repetition or delayed entry among the respondents, while the small private school representation mirrors the limited private education presence in the municipality rather than a sampling flaw, as respondents were drawn proportionally to each school's population. This implies that comparisons involving the private school subgroup should be interpreted with its smaller size in mind.

These findings are consistent with the reviewed literature. Sinaga et al. (2023) affirmed that problem-solving ability is closely tied to learners' developmental stage, supporting the relevance of the respondents' age-appropriate profile to their readiness for abstract mathematical reasoning. Rather and Kushwah (2025) found no significant gender difference in problem-solving ability and achievement, suggesting that the female-dominated sample does not bias the study's problem-solving results. Meanwhile, Bernardo et al. (2022) documented that public school learners in the Philippines operate under different resource conditions than their private school counterparts, confirming that the predominance of public school respondents situates this study squarely within the population most affected by structural constraints in mathematics education.

Students' Attitudes Toward Problem Solving in Mathematics

The highest-rated indicator is the students' belief that solving math problems will be useful in real life, which earned a rating of Strongly Agree, interpreted as Very Strong Liking. This means that the strongest attitudinal anchor of Grade 7 learners is utilitarian rather than affective: they value problem solving for what it can do for them, not primarily for the pleasure of doing it. This distinction carries an important implication. Utility-driven motivation is durable but conditional; it holds only for as long as learners can see the connection between classroom tasks and their lived realities. When instruction turns abstract, as it does in Grade 7 algebra, that connection weakens precisely where difficulty increases. The result may be traced to learners' everyday encounters with computation

in household budgeting, market transactions, and livelihood activities common in a rural municipality like Tago, and to the K to 12 curriculum's consistent framing of mathematics as a practical life skill. It is also telling that the lowest-rated positive indicator is excitement upon receiving a new problem, which, while still at the level of Strong Liking, reveals that appreciation of mathematics outruns enthusiasm for it. Learners are convinced of its worth but not yet captivated by it, suggesting that instruction has succeeded in communicating relevance more than in generating intrinsic engagement.

On the other hand, the lowest-rated indicator in the entire table is the preference to copy answers rather than solve problems independently, which received a rating of Disagree, interpreted as Little Negativity. This means learners reject academic shortcuts and claim ownership of their solutions, an encouraging sign of academic integrity. Its implication, however, must be read alongside the qualitative finding that students depend heavily on teacher and peer assistance: learners do not want to copy, but many cannot yet work alone, which suggests their independence is aspirational rather than fully achieved. Meanwhile, the item on getting easily frustrated when unable to solve a problem quickly obtained a Neutral rating, interpreted as Mixed Feeling, the highest among the negative indicators, and the items on losing interest in many-step problems and avoiding complicated ones likewise registered Mixed Feeling. The pattern across these three items is coherent and diagnostic: negativity among the respondents is not directed at mathematics as a subject but at a specific task condition, namely prolonged, multi-step problem solving. This points to fragile frustration tolerance rather than dislike, plausibly rooted in gaps in procedural fluency that make long problems cognitively exhausting, and in limited exposure to productive struggle as a normal part of doing mathematics.

Taken as a whole, the overall mean for Positive Attitude corresponds to Agree, interpreted as Strong Liking, while the overall mean for Negative Attitude corresponds to Disagree, interpreted as Little Negativity. Read together, these two ratings establish that the affective terrain of Grade 7 learners is fundamentally favorable but not frictionless: a strong constructive disposition coexists with task-specific frustration. This is directly relevant to the research problem because it rules out generalized negative attitude as the primary source of the challenges learners encounter, and it redirects attention toward the conditions under which positive attitudes break down, namely complexity, length, and time pressure. For the proposed intervention, this means the goal is not attitude repair but attitude protection: sustaining the existing liking for mathematics while building the tolerance and fluency needed to survive its more demanding tasks.

These findings are substantiated by the reviewed literature. Rentuaya and Tado (2024) affirmed that teacher encouragement and parental expectations nurture positive attitudes among Filipino learners, which helps explain the favorable dispositions observed in a community where schooling carries strong family expectations. Rehman et al. (2025) demonstrated that learners' perceptions of mathematics improve when concepts are explored through real-life application, consistent with the primacy of the real-life usefulness indicator and with Ajzen's (1991) proposition that attitudes formed around valued outcomes drive behavioral intention. However, the finding of Wakhata et al. (2022) that secondary students exhibit negative attitudes toward mathematics word problems

partially challenges the generally low negativity found here; the contradiction is resolved by the Mixed Feeling ratings on frustration and multi-step tasks, which confirm that the negativity Wakhata et al. observed does exist among the respondents but remains confined to complex problem types rather than generalized to the subject.

Students' Confidence in Learning Problem Solving in Mathematics

The findings indicate that students demonstrate a generally high level of confidence in learning problem solving in mathematics. Among the indicators, commitment and persistence emerged as the strongest aspect of students' confidence. This result suggests that many learners exhibit determination and resilience when attempting mathematical problems, even when tasks become challenging. Such persistence is an important characteristic in mathematical learning because problem solving often requires sustained effort, careful reasoning, and repeated attempts before arriving at correct solutions.

In contrast, stability of confidence registered the lowest level among the indicators, although it still reflects a favorable extent of confidence among students. This finding implies that while learners generally believe in their ability to solve mathematical problems, their confidence may fluctuate depending on the complexity of the tasks or the learning conditions they encounter. Some students may initially approach mathematical problems with confidence but may experience uncertainty when faced with unfamiliar problem structures or difficult mathematical concepts.

The dominance of commitment and persistence among the indicators highlights the importance of perseverance in mathematical problem solving. Students who demonstrate strong persistence are more likely to continue working on mathematical tasks despite encountering difficulties. This observation supports the findings of Alniak-Daye and Ogan-Bekiroglu (2025) who emphasized that learners' persistence in solving mathematical and scientific problems significantly contributes to the development of stronger problem-solving competencies. Their study found that when students are encouraged to persist and explore different solution strategies, they develop greater confidence and deeper conceptual understanding of mathematical ideas.

Furthermore, the generally high level of confidence observed among students may be influenced by supportive classroom environments and effective instructional strategies implemented by teachers. According to Tan et al. (2024), students' confidence in mathematics can be strengthened when instructional practices provide clear explanations, constructive feedback, and opportunities for students to actively engage in mathematical discussions. When learners receive encouragement and guidance during problem-solving activities, they tend to develop stronger beliefs in their mathematical abilities and become more willing to participate in challenging tasks.

However, the relatively lower level of stability of confidence suggests that learners' self-beliefs may still be vulnerable to fluctuations during the learning process. Confidence in mathematics is often influenced by students' prior experiences with success or failure

in solving mathematical problems. Mulungye (2023) explained that students' confidence becomes more stable when they experience consistent mastery of mathematical competencies through structured learning approaches that gradually develop their skills and understanding. When learners repeatedly experience success in solving mathematical tasks, their confidence becomes more resilient and less likely to decline when facing complex problems.

Similarly, the ability of students to use effective problem-solving strategies contributes to the development of mathematical confidence. Learners who are familiar with systematic approaches in solving problems are more capable of analyzing mathematical situations and identifying appropriate solution methods. The study of Amanda et al. (2024) highlighted that problem-based learning environments help students strengthen both their critical thinking and confidence because they allow learners to actively apply reasoning skills in solving authentic problems. Such experiences enable students to develop a sense of competence and control when approaching mathematical challenges.

Challenges Encountered by Students in Problem Solving

Theme 1. Conceptual Difficulty in Algebra

The responses imply that the learners experienced difficulty in transitioning from arithmetic operations toward abstract mathematical reasoning. Algebra introduces symbolic representation, relational thinking, and procedural manipulation of expressions, which become challenging for students who still rely on concrete mathematical understanding. The confusion expressed by the learners suggests that they struggle to connect mathematical symbols with their meanings and applications. This creates uncertainty whenever they encounter unfamiliar equations or complex algebraic procedures.

The findings further imply that conceptual misunderstanding contributes to learners' low confidence in problem solving. Instead of analyzing the relationship among mathematical elements, students tend to depend on memorization of procedures without fully understanding why certain steps are performed. Consequently, when the structure of the problem changes, the learners become confused and unable to proceed independently.

The findings support Sinaga et al. (2023), who emphasized that students' understanding of problem-solving processes significantly influences mathematics learning outcomes because learners must first understand the nature of the problem before identifying appropriate strategies for solving it. Likewise, Flores and Hinton (2019) explained that students often experience difficulty in abstract mathematical concepts when adequate conceptual scaffolding and concrete representation are lacking during instruction.

Theme 2. Weakness in Basic Mathematical Operations

The responses reveal that students' problem-solving difficulties are also rooted in weak mastery of prerequisite mathematical skills. Learners who are not fluent in multiplication, fractions, and division tend to struggle more when solving multi-step problems because they allocate most of their cognitive effort to basic computations instead of analyzing the problem itself. This affects their ability to focus on higher-order reasoning and mathematical interpretation.

The findings imply that foundational mathematical competencies remain essential in developing problem-solving ability. Weaknesses in basic operations may continue to affect students' performance in higher mathematical concepts if these gaps are not addressed through remediation and reinforcement activities. Learners who repeatedly experience computational errors may eventually develop frustration and negative attitudes toward mathematics.

The findings support Mulungye (2023), who emphasized that mastery learning strategies improve students' mathematical competence by strengthening prerequisite skills before progressing to more advanced mathematical tasks. Amanda et al. (2024) also explained that poor foundational understanding limits students' ability to engage in higher-order problem solving because learners become overly focused on basic computations rather than analytical reasoning.

Theme 3. Difficulty in Understanding Mathematical Problems

These responses indicate that students' problem-solving difficulties are strongly connected to comprehension and interpretation skills. Mathematical problem solving requires learners to decode mathematical language, identify important information, and translate verbal statements into mathematical expressions. Learners who struggle in comprehension may fail to solve the problem correctly even when they possess the computational skills needed.

The findings imply that mathematics learning is interconnected with reading comprehension and communication skills. Difficulties in understanding instructions and mathematical vocabulary may cause learners to misinterpret the problem and apply incorrect procedures. This highlights the need for contextualized instruction, simplified explanations, and guided interpretation of mathematical statements.

The findings support Wakhata et al. (2022), who found that students' challenges in mathematical word problems are often associated with difficulty in understanding mathematical language and interpreting problem statements. Similarly, Rather and Kushwah (2025) explained that problem-solving ability requires the capacity to analyze unfamiliar situations systematically and understand the demands of the problem before identifying solutions.

Theme 4. Limited Retention of Formulas and Procedures

The responses suggest that many learners rely heavily on memorization instead of deep conceptual understanding. When formulas are learned mechanically without understanding their purpose and application, learners easily become confused whenever they encounter variations in problem structure. The inability to retain procedures also indicates limited mastery of mathematical concepts.

The findings imply that mathematics instruction should focus not only on procedural fluency but also on conceptual understanding. Students may develop better retention when they are given opportunities to explain mathematical processes, practice repeatedly, and connect formulas to real-life applications. Strengthening conceptual understanding may help reduce dependence on rote memorization.

The findings support Flores and Hinton (2019), who explained that students develop stronger mathematical understanding when instruction progresses from concrete representation toward abstract reasoning. Mulungye (2023) likewise emphasized that mastery learning promotes better retention because learners revisit concepts repeatedly until mastery is achieved.

Theme 5. Dependence on Teacher and Peer Assistance

The responses imply that many learners still lack confidence and independence in mathematical problem solving. Although teacher guidance and peer support are beneficial in facilitating learning, excessive dependence may prevent students from developing self-regulated learning and independent reasoning skills. The fear of committing mistakes may discourage students from attempting solutions independently.

The findings further imply that students need structured support systems that gradually build confidence and independence in solving problems. Collaborative learning activities, guided practice, and scaffolded instruction may help learners transition from dependence toward autonomous problem solving. Building learners' confidence is important in reducing mathematics anxiety and improving engagement.

The findings support Tan et al. (2024), who found that supportive learning environments and interactive instructional tools reduce mathematics anxiety and improve students' confidence in mathematics learning. Similarly, Alniak-Daye and Ogan-Bekiroglu (2025) emphasized that collaborative and guided problem-solving activities improve learners' confidence, willingness to cope with difficult tasks, and overall problem-solving skills.

Differences in Attitude and Confidence According to School Type

The results reveal that negative attitude obtained the highest computed t-value and showed a highly significant difference when students were grouped according to school type. This finding implies that learners from different school environments vary considerably in the extent to which they develop unfavorable perceptions toward

mathematics. Differences in exposure to instructional support, classroom engagement, teacher interaction, and academic pressure may contribute to the formation of negative attitudes among learners. Students who experience less supportive or less engaging mathematical environments may become more likely to develop fear, frustration, or avoidance behaviors toward mathematical problem solving.

This result may be understood in light of the contextual differences among the participating schools. The public schools in the study serve larger Grade 7 populations, which often entails bigger class sizes, heavier teacher loads, and fewer opportunities for individualized feedback, conditions under which struggling learners may accumulate repeated experiences of failure that harden into negative attitudes. The lone private school, with a much smaller enrollment, may afford closer teacher supervision and more immediate remediation, which can buffer learners against developing unfavorable dispositions. The especially large t-value for negative attitude suggests that it is the domain most sensitive to these environmental conditions, since negative feelings toward mathematics tend to intensify through repeated unsupported struggle rather than through a single experience.

Meanwhile, belief in ability to solve registered the lowest computed t-value and did not show a significant difference according to school type. This suggests that students from both public and private schools possess relatively similar levels of self-belief in their capability to solve mathematical problems. Regardless of differences in school setting, learners generally perceive themselves as capable of attempting and solving mathematical tasks. This implies that confidence in one's mathematical ability may develop through personal learning experiences and classroom exposure that are not necessarily dependent on school type alone.

The highly significant difference observed in both positive and negative attitudes suggests that school environment strongly influences learners' emotional and motivational responses toward mathematics. Students' attitudes are often shaped by the quality of instructional practices, classroom climate, and opportunities for meaningful participation in mathematical activities. Learners who experience encouraging and engaging instruction are more likely to develop positive perceptions toward mathematical problem solving, while those exposed to stressful or discouraging learning conditions may develop stronger negative attitudes. This finding supports the study of Tan et al. (2024), which emphasized that classroom interaction and supportive instructional environments significantly affect students' attitudes toward mathematics. Their study explained that learners who are actively engaged in collaborative and technology-supported mathematical activities tend to demonstrate more favorable attitudes and stronger participation in problem-solving tasks.

Similarly, Wakhata et al. (2022) noted that students often develop negative attitudes toward mathematics when they experience repeated difficulties in understanding mathematical word problems and when instructional approaches fail to sustain their interest and confidence. Their findings highlighted that negative perceptions toward mathematics are often associated with frustration, anxiety, and low enjoyment during

mathematical activities. This perspective supports the present result showing that learners' negative attitudes vary according to school context and instructional experience.

The absence of a significant difference in belief in ability to solve further indicates that learners' self-belief in mathematics may be influenced by factors beyond school classification. Students may develop confidence through individual experiences of success, personal motivation, and repeated exposure to mathematical problem solving regardless of whether they study in public or private schools. This observation aligns with the findings of Mulungye (2023), who emphasized that confidence develops when learners experience gradual mastery of mathematical concepts through guided practice and consistent instructional support. Confidence therefore becomes more closely associated with personal academic experiences than with institutional classification alone.

The significant difference observed in the use of effective problem-solving strategy further suggests that school environment influences how learners apply mathematical reasoning and strategies when solving problems. Some schools may provide more opportunities for collaborative learning, inquiry-based activities, and strategic problem-solving instruction, enabling students to develop stronger procedural and analytical skills. Amanda et al. (2024) explained that problem-based learning environments strengthen learners' ability to apply effective strategies because students become actively involved in analyzing and solving authentic mathematical problems. Exposure to such instructional approaches may therefore contribute to differences in students' use of mathematical strategies across school types.

Moreover, the absence of significant differences in stability of confidence and commitment and persistence suggests that learners from both school types generally demonstrate comparable levels of resilience and determination when solving mathematical tasks. This implies that persistence in mathematics may be influenced more by individual motivation and personal learning experiences than by school context alone. Rehman et al. (2025) emphasized that meaningful and engaging mathematical experiences help sustain learners' persistence and confidence regardless of educational setting. When students perceive mathematics as relevant and achievable, they become more willing to continue working through challenging tasks.

Domains of Profiles and Confidence Affecting Students' Attitude Toward Problem Solving

As reflected in Table 6, stability of confidence obtained the highest result among the predictors and emerged as the only significant domain affecting students' attitude toward problem solving. This implies that learners' ability to maintain confidence when confronted with difficult or unfamiliar mathematical problems is the strongest measured factor shaping how favorably they regard problem-solving tasks. Students who trust their own capability are more likely to interpret difficult problems as challenges to be worked through rather than threats to be avoided, and this interpretive stance gradually consolidates into a positive attitude toward mathematics. For classroom practice, this means that efforts to

improve learners' attitudes are most productive when they target sustained confidence directly, such as through tasks that guarantee early experiences of success before difficulty is increased.

On the other hand, age registered the lowest result among the predictors and, together with sex, type of school, belief in ability to solve, commitment and persistence, and use of effective problem-solving strategy, did not significantly affect students' attitude. This implies that attitude toward problem solving is influenced less by who the learners are or where they study and more by their ability to maintain confidence when confronted with difficult or unfamiliar mathematical tasks. The narrow age range of Grade 7 respondents offers little room for age to differentiate attitudes, while the non-significance of sex and school type indicates that favorable and unfavorable dispositions cut across demographic lines. Teachers therefore cannot assume that older students, students of a particular sex, or students from a particular school type will naturally hold better attitudes; every group requires deliberate attitude-building and confidence-sustaining support.

A deeper reading of the model reveals three insights. First, the analysis of variance confirms that the predictors taken together explain a statistically reliable portion of the variation in attitudes, yet the coefficient of determination shows that this portion is modest. The greater part of attitude formation therefore lies in factors outside the model, such as quality of instruction, teacher and peer support, prior achievement, and mathematics anxiety, and the regression is best read as identifying which measured factor carries genuine predictive weight rather than as a complete account. Second, stability of confidence emerged as the only statistically significant predictor, while belief in ability to solve and commitment and persistence did not reach significance. This suggests that learners' ability to maintain confidence when confronted with difficult or unfamiliar mathematical tasks carries greater predictive weight than the other confidence domains when considered simultaneously in the model. Sustained confidence may therefore play an important role in shaping how learners respond to mathematical problem solving experiences, particularly when they encounter difficulty, uncertainty, or initial failure. Third, the non-significance of type of school is instructive when read alongside Table 6. Although attitudes differed between public and private school learners when compared directly, school type loses its predictive power once confidence is considered, implying that school-type differences operate largely through the confidence-related factors rather than school classification alone.

The dominant influence of stability of confidence is supported by Schunk and DiBenedetto (2021), who affirmed that students with high self-efficacy demonstrate greater resilience when initial efforts fail, while those low self-efficacy are more likely to disengage prematurely. Alniak-Daye and Ogan-Bekiroglu (2025) likewise emphasized that collaborative and guided problem-solving activities improve learners' confidence and willingness to cope with difficult tasks. Campanilla (2025) likewise established that self-efficacy is a strong predictor of mathematics performance among Filipino learners, and Granello et al. (2025) reported that improving math self-efficacy and self-concept in the middle grades yields more favorable dispositions toward the subject. Tan et al. (2024) further emphasized that students' confidence in their mathematical ability significantly

influences their engagement in problem-solving activities. These findings support the present result that stability of confidence emerged as the only significant predictor, highlighting the importance of learners' ability to maintain confidence when confronted with difficulty.

The non-significance of the demographic variables is supported by Sinaga et al. (2023), who noted that students' mathematical attitudes are influenced by classroom experiences, teaching approaches, and opportunities to develop problem-solving skills rather than by demographic differences alone. However, this result is negated in part by Rather and Kushwah (2025), who found gender-based differences in problem-solving ability among secondary students, and by Bernardo et al. (2022), whose machine-learning analysis showed contrasting profiles of low-performing mathematics students between public and private schools in the Philippines. The divergence suggests that while demographic factors may shape performance and learner profiles in broader samples, their influence on attitude in the present, more homogeneous Grade 7 sample was overridden by the psychological variable of stability of confidence.

Conclusions

Based on the findings of the study, the following conclusions are drawn in sequence with the statement of the problem.

In terms of profile, the Grade 7 learners of Tago constitute a developmentally typical early-adolescent population, largely within the expected age range, predominantly female, and mostly enrolled in public schools. This concludes that their difficulties in problem solving cannot be attributed to atypical schooling progression, and that mathematics instruction in the locality must be responsive above all to the realities of the public-school setting where most learners are situated.

With respect to attitude, negative disposition toward mathematics is not the root of students' problem-solving difficulties. Learners enter the classroom with a receptive and appreciative orientation, particularly toward the practical value of problem solving, which means teachers can build on an existing affective foundation rather than repair one.

As to confidence, students' self-assurance in problem solving is present but fragile. Their commitment and persistence outpace the stability of their confidence, indicating that their confidence at this level may be easily shaken by unfamiliar or multi-step tasks and must be deliberately stabilized rather than assumed to exist.

Regarding the challenges encountered, the academic struggles of Grade 7 learners are fundamentally conceptual, linguistic, and procedural rather than motivational. Willingness to engage is not the barrier; unmastered algebraic foundations, weak operational fluency, limited comprehension of mathematical language, poor retention, and dependence on others are, revealing that students have not yet developed the capacity for independent mathematical work.

Concerning school type, the institution a student attends shapes the affective and strategic dimensions of mathematics learning but not the learner's core self-beliefs. Attitudes and strategy use are environmentally conditioned and can therefore be improved through equitable instructional support, while confidence in one's ability transcends institutional boundaries.

On the predictors of students' attitudes, stability of confidence emerged as the only statistically significant factor among the variables examined. This indicates that learners' ability to maintain confidence when confronted with difficult or unfamiliar mathematical tasks is an important consideration in their problem solving experiences. Strengthening and sustaining students' confidence is consequently the most strategic point of instructional intervention, affirming Bandura's Social Cognitive Theory in the local context.

Finally, the convergence of fragile confidence, conceptual and linguistic struggles, and the significant predictive role of stability of confidence establishes the necessity of a structured response. The proposed Mathematics Confidence and Problem-Solving Enhancement Program is thus a warranted, evidence-grounded intervention that directly addresses the gaps revealed by the study rather than a merely supplementary activity.

Recommendations

In light of the conclusions drawn from this study, the following recommendations are respectfully offered to the relevant stakeholders. All recommendations are expressed in suggestive terms in recognition of the professional judgment and contextual authority of each concerned entity.

Students may benefit from taking an active and reflective role in their own mathematical learning, particularly by engaging in regular and deliberate practice of algebraic concepts and problem-solving procedures beyond what is required in class. Since the study found that frustration and dependency on others are recurring challenges, learners are encouraged to gradually develop persistence and independence by attempting problems on their own before seeking assistance, and by treating errors as opportunities for learning rather than as indicators of incapacity. Cultivating the ability to maintain confidence when facing difficult or unfamiliar mathematical problems may also prove worthwhile, as stability of confidence emerged as the only statistically significant factor among the variables examined. Students may likewise consider keeping a personal mathematics journal where they record formulas, solution strategies, and reflections on their learning progress, as this practice may help address the challenge of limited formula and procedure retention.

Building on the implications for learners, mathematics teachers may consider placing deliberate emphasis on strengthening students' ability to maintain confidence when facing difficult or unfamiliar mathematical problems, given that stability of confidence emerged as the only significant predictor of students' attitude toward problem solving. Teachers are encouraged to design instruction that is scaffolded and success-oriented, gradually increasing the complexity of tasks so that students experience consistent mastery before progressing to more demanding problems. Since the study also revealed a Mixed Feeling

toward frustration in multi-step problems and a comparatively lower Stability of Confidence, teachers may find it helpful to integrate short confidence-building routines into daily instruction, such as positive reinforcement, think-aloud modeling, and metacognitive reflection activities. Furthermore, given the language-related challenges identified in the study, mathematics teachers may consider collaborating with English and Filipino subject teachers to incorporate reading comprehension strategies into mathematics lessons, particularly in the decoding and interpretation of word problems. Teachers are likewise encouraged to explore the implementation of the Mathematics Confidence and Problem-Solving Enhancement Program (MCPS-EP) as a structured and context-sensitive instructional tool that directly addresses the five challenge areas identified in this study.

In support of these instructional efforts, school administrators may consider strengthening the professional development opportunities available to mathematics teachers, particularly those focused on confidence-building pedagogies, differentiated instruction, and the use of innovative and student-centered learning strategies. Given the highly significant differences in attitudes and problem-solving strategy use between public and private school students, administrators of public secondary schools in Tago may wish to explore the provision of additional instructional resources, such as supplementary algebra materials, manipulatives, and contextualized problem sets, to help bridge the attitudinal and strategic gap between school types. School heads may also consider endorsing and supporting the school-level implementation of the MCPS-EP, as the program is specifically designed to respond to the documented challenges of Grade 7 learners and is structured for integration within the regular instructional schedule without requiring significant additional resources.

From a broader policy and curriculum standpoint, curriculum developers and education program implementers may consider revisiting the sequencing and scaffolding of algebraic content in the Grade 7 mathematics curriculum, particularly the pace at which learners are expected to transition from arithmetic to abstract algebraic reasoning. The persistent identification of algebraic difficulty as the most prominent challenge suggests that a more deliberate and graduated introduction to symbolic and relational thinking may be beneficial for learners at this level. Policy makers at the division and regional level may also find it worthwhile to develop equity-focused initiatives that specifically address the attitudinal and strategic disparities between public and private school learners identified in this study, as these disparities suggest that school classification may be a proxy for unequal access to quality mathematical learning experiences. The findings of this study may serve as useful evidence in informing localized mathematics curriculum improvements or supplementary program development within the Schools Division of Surigao del Sur.

Future researchers may consider replicating this study in other municipalities or divisions within Surigao del Sur or in comparable rural educational contexts to determine whether the patterns of attitudes, confidence, and challenges identified here hold consistently across wider and more diverse populations. It may also be worthwhile to explore additional variables that could mediate or moderate the relationship between self-

efficacy and problem-solving challenges, such as teaching styles, classroom learning climate, parental involvement, and students' metacognitive awareness. A longitudinal research design could further illuminate how attitudes and confidence develop across grade levels and how early affective interventions shape long-term mathematical competence. Most importantly, a quasi-experimental study testing the effectiveness of the proposed MCPS-EP through a pre-test and post-test design is strongly encouraged, as this would generate the empirical evidence needed to validate the program and support its broader adoption in similar educational contexts.

Finally, the utilization of the Mathematics Confidence and Problem-Solving Enhancement Program (MCPS-EP) is recommended as the primary output and practical contribution of this study. The MCPS-EP may be adopted and contextualized by mathematics teachers, school administrators, and division education officers as a purposeful and evidence-grounded intervention for Grade 7 learners who experience difficulties in mathematical problem solving. Since the program was designed specifically in response to the five challenge themes and the significant predictive role of stability of confidence identified in this study, its implementation may be expected to address not only the cognitive and procedural gaps of learners but also the affective dimensions of their mathematical experience, including the strengthening of confidence, the reduction of negative attitudes, and the promotion of independent problem-solving. It is hoped that through the thoughtful and sustained implementation of the MCPS-EP, Grade 7 learners in Tago, Surigao del Sur may gradually develop the mathematical confidence, positive dispositions, and competence in problem solving that are essential for their success in higher mathematics and in their broader academic pursuits.

Proposed Intervention: Mathematics Confidence and Problem-Solving Enhancement Program (MCPS-EP)

The MCPS-EP is designed to address the identified gaps through six targeted program components, each anchored to a specific finding of the study. The program integrates conceptual instruction, affective support, and strategic skill development, delivered through a structured 9-week implementation framework.

Program Component (Linked to Finding)	Gap / Challenge Addressed (Based on Results)	Key Activities	Timeline (Week)	Responsible Person/s	Expected Outcome
Component 1: Algebraic Conceptual Mastery Module	Conceptual Difficulty in Algebra (Table 4 – most prominent challenge; algebraic expressions, variables,	• Step-by-step algebra instruction using visual representations • Use of algebra tiles and manipulatives • Guided practice with scaffolded	Weeks 1 – 3	Mathematics Teacher School Head (supervision) Researcher (monitoring)	Students demonstrate improved conceptual understanding of algebraic expressions and

	equations, polynomials)	problem sets • Peer teaching and cooperative learning activities • Formative quizzes on algebraic concepts			equations, reducing the most prevalent challenge identified in the study.
Component 2: Mathematical Operations Remediation Clinic	Weakness in Basic Mathematical Operations (Table 4 – fractions, multiplication, division, large numbers)	• Targeted drill activities on fractions and operations • Number sense building games and manipulatives • Mental math exercises and timed challenges • Error analysis worksheets (learning from mistakes) • Peer-assisted review sessions	Weeks 2 – 4	Mathematics Teacher Remedial/Support Teacher	Students achieve greater fluency and accuracy in basic mathematical operations, enabling them to solve multi-step problems more effectively.
Component 3: Mathematical Problem Comprehension Bridge	Difficulty in Understanding Mathematical Problems (Table 4 – confusion in interpreting questions, math language; also linked to significant school-type difference in strategies in Table 5, $t=4.010$, $p=0.000$)	• Reading comprehension-integrated math activities • Mathematical vocabulary development sessions • Bilingual (English/Filipino/Ta'glog) problem-solving exercises • Annotation strategies (underlining, keyword identification) • Collaborative interpretation activities in mixed-school groups	Weeks 3 – 5	Mathematics Teacher English/Filipino Teacher (co-facilitation) School Head	Students demonstrate improved ability to decode, interpret, and analyze mathematical word problems, reducing language-based barriers across school types.

Component 4: Retention and Formula Mastery Training	Limited Retention of Formulas and Procedures (Table 4 – forgetting formulas, solution steps, processes)	• Mnemonic devices and memory strategy instruction • Personal math formula reference cards/journals • Spaced retrieval practice (weekly review sessions) • Visual formula charts displayed in classrooms • Short retrieval quizzes at start of each session	Weeks 4 – 6	Mathematics Teacher School Head (classroom support)	Students exhibit better recall and application of mathematical formulas and procedures, reducing procedural errors in problem solving.
Component 5: Confidence and Self-Efficacy Building Workshop	Low Stability of Confidence (lowest mean = 3.456) Stability of Confidence = only statistically significant individual predictor of students' attitude (Table 6, coefficient=0.1299, $p=0.014$)	• Success-oriented problem sequences (easy-to-challenging) • Growth mindset reflection activities and journaling • Consistent positive feedback and encouragement protocols • "Math I Can Do" self-monitoring tracking sheets • Role-model sharing (peer success stories) • Relaxation and self-regulation techniques for math anxiety	Weeks 5 – 7	Mathematics Teacher Guidance Counselor (co-facilitation for affective support)	Students show increased stability of confidence and greater ability to maintain confidence when confronted with difficult or unfamiliar mathematical problems, contributing to more positive attitudes toward problem solving.
Component 6: Problem-Solving Strategy Equity Initiative	Significant Difference in Use of Effective Problem-Solving Strategies by School Type (Table 5, $t=4.010$,	• Strategy modeling and think-aloud demonstrations • Strategy reference cards distributed to all learners (both school types) • Cross-school collaborative	Weeks 6 – 9	Mathematics Teacher School Head Researcher (equity monitoring)	Public and private school students achieve comparable levels of problem-solving strategy

	p=0.000) Negative Attitude differences (t=14.700, p=0.000)	problem-solving sessions • Attitude reflection activities to address frustration and avoidance • Recognition of diverse solution approaches to build engagement			use; negative attitudes toward complex problems are reduced.
Pre-test and Post-test Assessment	Overall program evaluation aligned with all identified challenges and confidence indicators	• Pre-test: Problem-solving competence test + attitude and confidence survey (Week 1) • Post-test: Same instruments re-administered (Week 9) • Student focus group discussion on program experience • Teacher feedback and observation checklist	Week 1 & Week 9	Researcher Mathematics Teacher School Head (endorsement)	Evidence-based evaluation of program effectiveness in improving problem-solving competence, attitudes, and confidence among Grade 7 learners.

Compliance With Ethical Standards

The study complied with established ethical principles and research protocols to protect the rights, dignity, and welfare of the Grade 7 learners. Written approval was obtained from the Schools Division Superintendent and the heads of the participating schools before data collection. Because the participants were minors, informed consent was obtained from their parents or guardians, and learner assent was secured before participation. Participation was voluntary, and the learners were informed of their right to refuse participation or withdraw at any time without academic penalty. Anonymity and confidentiality were maintained, and the data gathered were used solely for academic and research purposes. Data privacy and the well-being of the respondents were safeguarded throughout the study. The researchers declared no conflict of interest in the conduct of the study and maintained objectivity in the interpretation of the findings. The manuscript underwent grammar and plagiarism checking through the Office of Research and Development of North Eastern Mindanao State University (NEMSU). All sources used in the study were properly acknowledged and cited. Artificial intelligence was used as an assistive tool in organizing and formatting portions of the manuscript for journal submission; however, the researchers retained full responsibility for the research data, analysis, interpretation, accuracy, and final content of the manuscript.

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APA Citation:

Ebay, K. S., & Elpidang, E. M. (2026). FOSTERING PROBLEM – SOLVING COMPETENCE: EXPLORING THE IMPACT OF ATTITUDES, CONFIDENCE, AND ACADEMIC STRUGGLES. *Ignatian International Journal for Multidisciplinary Research*, 4(8), 1280–1310. <https://doi.org/10.5281/zenodo.22095394>

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