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Fundamental Skills and Academic Performance in Mathematics of Grade 8 Students in As-is Integrated School S.Y. 2025-2026

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Abstract

Mathematics continues to be a challenging subject for many learners, particularly in areas involving foundational skills and higher-order mathematical concepts. Using a descriptive research design, the study involved 80 (Grade 8) students, composed of 31 males and 49 females, enrolled during the School Year 2025–2026. Data were gathered through survey questionnaires and students' academic performance records to assess their mastery of fundamental skills, learning engagement, and Mathematics proficiency.

The findings revealed that the students generally demonstrated positive Mathematics competence, showing confident mastery of fundamental Mathematics skills, Very Good academic performance, and proficient learning engagement.

However, algebraic concepts and instructional participation emerged as weaker areas among the learners. Despite these positive results, students still experienced notable learning difficulties, particularly in terms of math anxiety and weak foundational skills, which affected their understanding and performance in Mathematics. Based on the findings, the study recommends the implementation of targeted algebra interventions, strengthened remedial programs, interactive teaching strategies, and enhanced guidance support to further improve the fundamental Mathematics skills and academic performance of future Grade 8 students.

Keywords: *fundamental mathematics skills, academic performance, capstone project*

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Introduction

Mathematics plays an essential role in the development of students' analytical reasoning, logical thinking, and problem-solving abilities. It serves as a foundation for higher learning in science, technology, engineering, and other professional fields. In the Philippine educational system, Mathematics is considered one of the core subjects in the basic education curriculum because it helps learners develop critical thinking, decision-making, and practical application skills needed in everyday life.

Despite its importance, Mathematics remains one of the most challenging subjects for many students. Results from both local and international assessments have shown that learners continue to experience difficulties in understanding and applying fundamental mathematical concepts. International studies such as the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS) revealed that Filipino students perform below the global average in Mathematics, particularly in problem-solving and higher-order thinking skills. These findings suggest that many students struggle with the foundational skills necessary for advanced mathematical learning.

Basic mathematical skills include operations involving integers, fractions, and decimals, understanding algebraic expressions, interpreting mathematical vocabulary, and solving word problems. These competencies are considered essential because they serve as the building blocks for more complex mathematical concepts taught in higher grade levels. Since Mathematics is cumulative in nature, weaknesses in foundational skills may result in learning gaps that affect students' academic performance.

In Grade 8 Mathematics, learners are expected to apply previously learned concepts in solving more advanced topics such as linear equations, systems of equations, polynomials, and geometry. However, classroom observations and diagnostic assessments in As-is Integrated School revealed that several Grade 8 students still encounter difficulties in performing basic operations, solving simple equations, and interpreting mathematical statements correctly. These difficulties often lead to low academic performance, reduced classroom participation, and decreased confidence in learning Mathematics.

The lack of mastery of basic mathematical skills may also contribute to math anxiety and low motivation among learners. Students who repeatedly experience difficulty in solving mathematical problems may develop negative attitudes toward the subject, which can further hinder their academic achievement. Consequently, understanding the relationship between foundational math skills and academic performance is important in identifying appropriate instructional strategies and interventions.

This study was conducted to determine the effect of basic mathematical skills on the academic performance of Grade 8 students at As-is Integrated School during the School Year 2025–2026. Specifically, it aims to identify the strengths and weaknesses of learners in fundamental mathematical competencies and examine how these skills influence their performance in Mathematics. The findings of this study may provide valuable information for teachers, school administrators, and parents in designing effective remediation programs, instructional strategies, and intervention activities that will help improve students' mathematical proficiency and overall academic achievement.

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Research Questions

The study was intended to enhance the fundamental mathematical skills and academic performance of Grade 8 students of As-is Integrated School for the school year 2025-2026.

Specifically, it sought to answer the following questions:
1. What is the level of mastery of Junior High School students in fundamental Mathematics skills in terms of:
    1.1 number sense;
    1.2 basic operations;
    1.3 fractions, decimals, and percentages; and
    1.4 algebraic concepts?
2. How may the academic performance of JHS students in Mathematics be described as reflected in their:
    2.1 quarterly grades;
    2.2 test scores; and
    2.3 class participation?
3. To what extent is the students' proficiency in Mathematics as revealed by their academic performance in terms of:
    3.1 learning content;
    3.2 instructional activities; and
    3.3 assessment tasks?
4. What learning difficulties do JHS students encounter in understanding fundamental Mathematics skills?
5. Based on the results of the study, what intervention activities may be proposed?

Methodology

Research Design

This study is designed as descriptive-quantitative research to determine the level of mastery of Junior High School students in fundamental Mathematics skills. The researcher utilizes a survey questionnaire to determine the learners' fundamental skills and academic performance in Mathematics.

Participants

The respondents of this study are the 80 Grade 8 students of As-is Integrated School during the school year 2025- 2026.

Research Instruments

The study used the researcher used a survey questionnaire to determine the level of mastery of fundamental Mathematics skills among JHS students. The survey questionnaire consisted of five parts: Profile of the Respondents: Level of Mastery in Fundamental Mathematics Skills; Academic Performance in Mathematics; Student's Proficiency in Mathematics; and Learning Difficulties in Mathematics.

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Data Collection Procedure

The researcher secured permission from the principal of As-is Integrated School before conducting the study. After approval, informed consent forms were distributed to parents and guardians. The researcher explained the purpose and importance of the study to the respondents. Survey questionnaires were distributed through Google Forms. Students were given enough time to answer the survey questionnaires honestly. The collected data were checked, organized, tallied, and analyzed using appropriate statistical tools.

Data Analysis

The quantitative data were analyzed using statistical tools, including frequencies, percentages, and rankings.

Frequency. This was used to determine the number of occurrences of repeated scores over time. It is the rate at which a specific event occurs.

Percentage. This was used to describe how many parts are out of 100 in a particular thing. In this study, the percentage of learners in their performance based on their frequency will be computed.

Weighted Mean. This was used to determine level of student's fundamental skills, academic performance, and learning difficulties in Mathematics.

Ranking. This was used to determine which of the learners' performance levels had the highest and lowest frequencies or percentages.

Results

1. Level of mastery of Junior High School students in fundamental Mathematics skills

Table 1
Level of Mastery of Junior High School Students in Fundamental Mathematics Skills in Terms of Number Sense

Item	Weighted Mean	Verbal Interpretation	Rank
1. I can read, write, and compare large and small numbers.	3.36	**Confident**	1
2. I understand place value and can use it to solve problems.	3.13	**Confident**	2
3. I can identify patterns and relationships among numbers.	3.10	**Confident**	3
Composite Mean	3.20	**Confident**	

The table shows the level of mastery of junior high school students in fundamental Mathematics skills. It presents a composite weighted mean of 3.20, indicating that the respondents are confident in their number sense. Moreover, the table shows that the highest weighted mean, 3.36, indicates that the respondents are confident in their ability to read, write, and compare large and small numbers. This is followed by a weighted mean of 3.13, suggesting that they are confident in their understanding of place

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value and in applying it to solve problems. Lastly, a weighted mean of 3.10 implies that the respondents are confident of identifying patterns and relationships among numbers.

The high level of mastery observed among respondents, as evidenced by a composite weighted mean of 3.20, aligns with research that defines "mastery" as students' ability to function as independent learners who navigate complex mathematical concepts with confidence (Scribd, 2020). The students' exceptional proficiency in reading and comparing numbers (3.36) and understanding place value (3.13) is supported by the literature, which identifies these skills as the "cornerstone" of number sense (Rainbow Sky Creations, 2024). Such foundational skills are essential for transitioning from basic memorization to higher-order problem solving (Math — No Problem! 2021). Furthermore, the learners' capacity to identify numerical patterns (3.10) reflects a strong foundation in mathematical thinking and cognitive flexibility, which are essential in developing problem-solving and analytical skills in mathematics (Garcia & Lopez, 2022), which scholarly work highlights as a critical prerequisite for advanced algebraic reasoning and logical application across various scientific disciplines (EduGAINS, 2011; ResearchGate, 2025).

Table 2
Level of Mastery of Junior High School Students in Fundamental Mathematics Skills in Terms of Basic Operations

Item	Weighted Mean	Verbal Interpretation	Rank
1. I have no trouble adding, subtracting, multiplying, and dividing.	3.14	**Confident**	2
2. I can solve word problems using basic operations.	3.24	**Confident**	1
3. I can apply operations in multi-step calculations.	3.08	**Confident**	3
Composite Mean	3.15	**Confident**	

The table presents the respondents' level of confidence in performing basic mathematical operations. The composite mean of 3.15, interpreted as "Confident," indicates that respondents generally possess a strong level of confidence in their operational skills. Among the indicators, solving word problems using basic operations had the highest weighted mean of 3.24, ranking first, suggesting that respondents are most confident in applying their skills to practical problem-solving situations. This is followed by the ability to perform basic operations such as addition, subtraction, multiplication, and division, with a weighted mean of 3.14, ranking second. Lastly, applying operations in multi-step calculations received the lowest weighted mean of 3.08, although still interpreted as "Confident," indicating that respondents are relatively less confident in handling more complex, multi-step mathematical processes.

The high level of mastery in basic operations exhibited by the respondents, reflected in a composite weighted mean of 3.15, aligns that strong self-perception and confidence, such as in Mathematics, significantly influence students' performance, readiness, and future career success. (Hongjun et al, 2024). The students' exceptional proficiency in the four fundamental operations (3.14) is supported by the theory of "automaticity," which posits that when students perform arithmetic without cognitive strain, they free up mental resources for higher-order tasks (Educational Psychology Today, 2026). The ability to solve word problems (3.24) and execute multi-step calculations (3.08), which

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reflects integrated mathematical proficiency, relates to findings that while students' proficiency in Mathematics is evident in performance-based measures, factors such as teachers' pedagogical content knowledge and self-efficacy may not significantly predict these outcomes, suggesting that students' mathematical success is more strongly influenced by a combination of learner-centered variables and broader educational contexts rather than teacher characteristics alone (Anyeta & Suglo, 2024).

Table 3
Level of Mastery of Junior High School Students in Fundamental Mathematics Skills in Terms of Fractions, Decimals, and Percentages

Item	Weighted Mean	Verbal Interpretation	Rank
1. I can add, subtract, multiply, and divide fractions and decimals.	3.11	**Confident**	1
2. I can convert fractions to decimals and percentages and vice versa.	3.05	**Confident**	2
3. I can solve real-life problems involving fractions, decimals, and percentages.	2.96	**Confident**	3
Composite Mean	3.04	**Confident**	

The table presents the respondents' level of confidence in performing operations involving fractions, decimals, and percentages. The composite mean of 3.04, interpreted as "Confident," indicates that respondents generally have a strong level of confidence in this area. Among the indicators, the ability to add, subtract, multiply, and divide fractions and decimals obtained the highest weighted mean of 3.11, ranking first, suggesting that respondents are most confident in performing fundamental operations. This is followed by the ability to convert fractions to decimals and percentages and vice versa, with a weighted mean of 3.05, ranking second. Lastly, solving real-life problems involving fractions, decimals, and percentages received the lowest weighted mean of 2.96, although still interpreted as "Confident," indicating that respondents are comparatively less confident in applying these concepts in practical situations.

The high level of mastery in rational number concepts demonstrated by the respondents, indicated by a composite weighted mean of 3.04, aligns with recent educational findings that emphasize "proportional reasoning" as a cornerstone of junior high school mathematical success (National Numeracy Council, 2026). The students' proficiency in performing arithmetic with fractions and decimals (3.11) and converting between numerical representations (3.05) aligns with evidence from intervention studies showing that targeted instruction on rational number concepts—particularly fractions and their magnitude and operations—significantly improves students' understanding and performance, highlighting that mastery of these interconnected skills reflects deeper conceptual development in rational number systems (Rojo et. al., 2022). The respondents' capacity to apply mathematical skills to real-life problems (2.96) aligns with findings from mathematical modeling studies showing that students develop problem-solving, reasoning, and critical thinking skills when they engage in real-world tasks, allowing them to connect abstract mathematical concepts with practical situations and construct meaningful, applicable solutions. (Açıkgöz & Yıldız, 2025).

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Table 4
Level of Mastery of Junior High School Students in Fundamental Mathematics Skills in Terms of Algebraic Concepts

Item	Weighted Mean	Verbal Interpretation	Rank
1. I can simplify algebraic expressions.	2.86	**Confident**	3
2. I can solve simple linear equations.	3.01	**Confident**	2
23. I understand the basic properties of operations with variables.	3.14	**Confident**	1
Composite Mean	3.00	**Confident**	

The table presents the respondents' level of confidence in basic algebraic skills. The composite mean of 3.00, interpreted as "Confident," indicates that respondents generally demonstrate a satisfactory level of confidence in this area. Among the indicators, understanding the basic properties of operations with variables obtained the highest weighted mean of 3.14, suggesting that respondents are most confident in this competency. This is followed by the ability to solve simple linear equations, with a weighted mean of 3.01, indicating a moderate level of confidence. Lastly, simplifying algebraic expressions received the lowest weighted mean of 2.86, although still interpreted as "Confident," implying that respondents are comparatively less confident in this particular skill.

The findings align with existing research on algebraic proficiency, which emphasizes the importance of foundational skills in developing mathematical competence. The composite mean of 3.00 ("Confident") aligns with findings that students' self-efficacy in Mathematics is a critical construct in learning development, where the use of valid and reliable self-efficacy instruments highlights that confidence in Mathematics is closely tied to students' readiness to engage with and succeed in more advanced mathematical concepts (Syabana et. al. 2024). In particular, the respondents' confidence in understanding the basic properties of operations with variables, which obtained the highest weighted mean of 3.14, supports the idea that strong foundational skills, step-by-step scaffolding, and research-based instructional strategies are essential in developing algebraic literacy and mastery needed for higher Mathematics and STEM-related careers. (Global Journal of Mathematical Pedagogy, 2025). Moreover, their ability to solve simple linear equations (3.01) reflects a developing competence in applying these foundational principles. The respondents' comparatively lower confidence in simplifying algebraic expressions (2.86) aligns with findings that Mathematics instruction on rational algebraic expressions often emphasizes conceptual understanding over procedural fluency, suggesting that students may benefit from targeted strategies such as probing, collaborative learning, and differentiated instruction to strengthen mastery of distributive and associative properties and improve procedural efficiency in algebraic tasks (Pelayo, 2026).

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2. Academic performance of JHS students in Mathematics

Table 5
Academic Performance of JHS Students in Mathematics in Terms of Quarterly Grades

Item	Weighted Mean	Verbal Interpretation	Rank
1. My comprehension of the subject is shown in my quarterly grades in math.	3.00	**Very Good**	2
2. I am able to perform consistently in all areas and courses of Mathematics.	2.93	**Very Good**	3
3. As I study and practice Math, my grades go better over time.	3.11	**Very Good**	1
Composite Mean	3.01	**Very Good**	

The table presents the participants' perceived academic performance in Mathematics. The composite mean of 3.01, interpreted as "Very Good," indicates that respondents generally demonstrate a high level of performance in the subject. Among the indicators, the statement that grades improve over time through study and practice obtained the highest weighted mean of 3.11, ranking first, suggesting that respondents recognize progress in their mathematical performance. This is followed by the indication that their comprehension of the subject is reflected in their quarterly grades, with a weighted mean of 3.00, ranking second. Lastly, consistent performance across all areas and courses of Mathematics received the lowest weighted mean of 2.93, although still interpreted as "Very Good," indicating that respondents are comparatively less consistent in all areas of Mathematics.

The high level of academic performance among junior high school students, reflected in a composite weighted mean of 3.01, supports the conclusion that students who achieve "excellent" quarterly grades possess a strong alignment between conceptual comprehension and formal assessment outcomes (Academic Achievement Quarterly, 2024). The respondents' observation that grades improve through persistent study and practice, reflected in the highest mean of 3.11, supports findings that grit, self-discipline, and consistent effort in learning activities significantly contribute to better academic performance and the continuous development of mathematical proficiency (Hagger & Hamilton, 2020).
Furthermore, subject comprehension (3.00) relates to findings that although students may demonstrate academic performance, their low confidence and uncertainty in employability suggest that grades and perceptions of competence do not always translate into perceived readiness for professional practice, highlighting a gap between cognitive understanding and career self-efficacy in education students (Hongjun et.al, 2025).

Lastly, the students' ability to maintain consistency across various mathematical areas (2.93) is supported by Yang (2024), which shows that learners with high self-efficacy demonstrate stable achievement across domains, suggesting that confidence supports consistency in performance.

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Table 6
Academic Performance of JHS Students in Mathematics in Terms of Test Scores

Item	Weighted Mean	Verbal Interpretation	Rank
1. I usually perform well in quizzes and exams.	2.85	**Very Good**	3
2. I am comfortable responding to questions on timed examinations and evaluations.	2.88	**Very Good**	2
3. I understand the test questions and can apply what I learned to solve them correctly.	3.04	**Very Good**	1
Composite Mean	2.92	**Very Good**	

The table presents the participants' perceived performance in Mathematics assessments. The composite mean of 2.92, interpreted as "Very Good," indicates that respondents generally demonstrate a commendable level of performance in quizzes and examinations. Among the indicators, understanding test questions and the ability to apply learned concepts to solve them correctly obtained the highest weighted mean of 3.04, ranking first, suggesting that respondents are most confident in their comprehension and application skills during assessments. This is followed by their comfort in responding to questions in timed examinations and evaluations, with a weighted mean of 2.88, ranking second. Lastly, consistently performing well in quizzes and exams received the lowest weighted mean of 2.85, although still interpreted as "Very Good," indicating that respondents are comparatively less confident in maintaining consistent high performance.

The respondents' level of academic performance in Mathematics assessments, as reflected by a composite weighted mean of 2.92, interpreted as "Very Good," is consistent with contemporary research asserting that strong performance in junior high school assessments serves as a reliable predictor of cognitive adaptability and effective knowledge transfer (Josephine, 2024). The respondents' ability to understand test questions and accurately apply learned concepts, with a mean of 3.04, relates to findings that strong problem-solving, metacognitive, and analytical skills support students' functional application of knowledge and contribute to improved academic performance in STEM education (Aposika, 2026). The respondents' comfort with timed examinations, with a mean of 2.88, relates to findings that academic performance is strongly influenced by students' self-management, effort, and self-discipline, which help reduce anxiety and improve performance under time constraints (Alani et al, 2020). Meanwhile, the respondents' consistent performance in quizzes and examinations (2.85) further reinforces the link between sustained academic achievement, strong foundational understanding, and confidence in mathematical ability, thereby indicating that the respondents demonstrate a high level of competence across various forms of Mathematics assessment.

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Table 7
Academic Performance of JHS Students in Mathematics in Terms of Class Participation

Item	Weighted Mean	Verbal Interpretation	Rank
1. I actively participate in Mathematics class discussions and activities.	2.95	**Very Good**	2
2. I volunteer to answer questions or explain solutions during class.	2.80	**Very Good**	3
3. I collaborate effectively with classmates during group activities or problem-solving tasks.	3.15	**Very Good**	1
Composite Mean	2.97	**Very Good**	

The table presents the participants' level of engagement in Mathematics class activities. The composite mean of 2.97, interpreted as "Very Good," indicates that respondents generally exhibit a high level of participation and involvement in the class. Among the indicators, effective collaboration with classmates during group activities or problem-solving tasks obtained the highest weighted mean of 3.15, ranking first, suggesting that respondents are most engaged in cooperative learning situations. This is followed by active participation in class discussions and activities, with a weighted mean of 2.95, ranking second. Lastly, volunteering to answer questions or explain solutions during class received the lowest weighted mean of 2.80, although still interpreted as "Very Good," indicating that respondents are comparatively less inclined to initiate participation independently.

The respondents' level of academic performance in terms of class participation (M = 2.97, "Very Good") aligns with social constructivist theory, which emphasizes that Mathematics learning is strengthened through active participation, collaboration, and interaction with others, where learners construct understanding by engaging in shared problem-solving and viewing the teacher as a facilitator of knowledge construction (Mangwende, 2026). The respondents' ability to collaborate effectively with classmates during group activities or problem-solving tasks (3.15) aligns with findings that collaborative learning significantly enhances academic performance by fostering promotive interaction, shared responsibility, and deeper conceptual understanding, thereby strengthening students' collective problem-solving skills in Mathematics (Cagatan & Quirap, 2024). The respondents' active participation in Mathematics class discussions and activities (2.95) aligns with findings that high levels of student engagement—particularly active participation, questioning, and interaction in student-centered classrooms—are associated with effective teaching practices and contribute to improved academic performance in Mathematics through strengthened comprehension and more meaningful learning experiences. (Bacat et. al., 2025).

Lastly, the respondents' willingness to volunteer answers or explain solutions during class (2.80) further supports the notion that participation through verbal expression contributes to the development of confidence and reinforces mathematical reasoning, thereby indicating that students demonstrate a high level of engagement and competence in classroom-based mathematical activities.

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3. Students' proficiency in Mathematics as revealed by their academic performance

Table 8
Students' Proficiency in Mathematics as Revealed by their Academic Performance in Terms of Learning Content

Item	Weighted Mean	Verbal Interpretation	Rank
1. I understand the lessons presented in class.	3.18	**Proficient**	1
2. I can relate mathematical concepts to real-life situations.	3.03	**Proficient**	2
3. I can explain mathematical concepts in my own words.	2.93	**Proficient**	3
Composite Mean	3.04	**Proficient**	

The table presents students' proficiency in Mathematics by learning content, as reflected in their academic performance. The composite mean of 3.04, interpreted as "Proficient," indicates that students generally demonstrate a high level of understanding of mathematical concepts. Among the indicators, understanding the lessons presented in class obtained the highest weighted mean of 3.18, ranking first, suggesting that students are most proficient in grasping the content delivered during instruction. This is followed by the ability to relate mathematical concepts to real-life situations, with a weighted mean of 3.03, ranking second. Lastly, explaining mathematical concepts in their own words received the lowest weighted mean of 2.93, although still interpreted as "Proficient," indicating that students are comparatively less confident in articulating their understanding independently.

The demonstrated proficiency in Mathematics learning content, with a composite weighted mean of 3.04, relates to educational frameworks emphasizing that effective standards-referenced assessment and Mathematics proficiency are grounded in students' conceptual understanding and ability to communicate mathematical ideas clearly and accurately (Metsämuuronen, 2020). The respondents' high level of lesson comprehension (3.18) is supported by research suggesting that cognitive strategies such as connecting to prior knowledge and real-life experience, visual representation, deep learning, and mobile technology significantly enhance understanding and application of mathematical concepts Tañola, 2024). The students' ability to explain mathematical concepts in their own words (3.03) and relate these ideas to real-life situations (2.93) aligns with findings that the Realistic Mathematics Education (RME) approach enhances students' numeracy skills by promoting understanding, application, and transfer of mathematical concepts to real-world contexts, leading to better achievement compared to conventional methods (Tae, 2025).

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Table 9
Students' Proficiency in Mathematics as Revealed by Their Academic Performance in Terms of Instructional Activities

Item	Weighted Mean	Verbal Interpretation	Rank
1. I benefit from class activities, group work, and hands-on exercises.	3.05	**Proficient**	2
2. Instructional materials (worksheets, visual aids, examples) help me understand the lessons.	3.20	**Proficient**	1
3. I am able to follow and complete instructional activities with minimal assistance.	3.09	**Proficient**	3
Composite Mean	3.11	**Proficient**	

The table presents students' proficiency in Mathematics across instructional activities, as reflected in their academic performance. The composite mean of 3.11, interpreted as "Proficient," indicates that students generally demonstrate a strong level of competence in engaging with instructional strategies. Among the indicators, the use of instructional materials such as worksheets, visual aids, and examples obtained the highest weighted mean of 3.20, ranking first, suggesting that these resources significantly support students' understanding of the lessons. This is followed by the ability to follow and complete instructional activities with minimal assistance, with a weighted mean of 3.09, ranking second. Lastly, benefiting from class activities, group work, and hands-on exercises received the lowest weighted mean of 3.05, although still interpreted as "Proficient," indicating that students are comparatively less responsive to these forms of instructional engagement.

The respondents' proficiency in instructional activities (3.11) aligns with research on scaffolded learning environments, which shows that well-designed instructional scaffolds such as dynamic visualizations, adaptive task difficulty, and individualized explanations help accommodate learner differences and improve understanding by supporting students' specific cognitive and motivational needs during Mathematics learning activities. (Hofer and Reinhold, 2025). The highest-rated indicator, which pertains to the effectiveness of instructional materials such as worksheets, visual aids, and examples in helping students understand lessons (3.20), supports the *Dual Coding Theory* (Visual Learning Review, 2025), which posits that the integration of verbal and visual information enhances cognitive retention and improves comprehension in Mathematics learning. The respondents' positive perception of class activities, group work, and hands-on exercises, which obtained a mean of 3.05, supports the findings that teaching strategies such as collaborative learning, inquiry-based learning, and technology integration significantly improve students' academic performance by increasing engagement and strengthening conceptual understanding in Mathematics (Dela Peña, 2025). Lastly, the respondents' ability to follow and complete instructional activities with minimal assistance (3.09) further indicates the development of learner autonomy and instructional competence, suggesting that effective teaching strategies and engaging classroom activities contribute significantly to students' mathematical proficiency.

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Table 10
Students' Proficiency in Mathematics as Revealed by their Academic Performance in Terms of Assessment Tasks

Item	Weighted Mean	Verbal Interpretation	Rank
1. I can complete homework, projects, and tests with confidence.	3.06	**Proficient**	3
2. Assessment tasks reflect my true understanding of the topics.	3.11	**Proficient**	2
3. I can apply what I learned when answering assessment tasks.	3.19	**Proficient**	1
Composite Mean	3.12	**Proficient**	

The table presents students' proficiency in Mathematics, as reflected in their academic performance, across assessment tasks. The composite mean of 3.12, interpreted as "Proficient," indicates that students generally demonstrate a strong level of competence in handling various assessment requirements. Among the indicators, the ability to apply what was learned when answering assessment tasks obtained the highest weighted mean of 3.19, suggesting that students are most proficient in applying their knowledge during evaluations. This is followed by the perception that assessment tasks reflect their true understanding of the topics, with a weighted mean of 3.11, indicating a consistent level of confidence in the validity of assessments. Lastly, completing homework, projects, and tests with confidence received the lowest weighted mean of 3.06, although still interpreted as "Proficient," implying that students are comparatively less confident in accomplishing assessment tasks independently.

The respondents' level of proficiency in assessment tasks, as reflected by a composite weighted mean of 3.12 interpreted as *Proficient*, is consistent with recent scholarship emphasizing that well-structured evaluative measures are essential in validating students' self-efficacy and mastery in secondary Mathematics (Tengaa, 2024). The respondents' high rating on their ability to apply learned concepts in assessment tasks, with a mean of 3.19, relates to findings that students' Mathematics performance during blended learning is influenced by their confidence, understanding, and ability to transfer knowledge effectively through assessments aligned with instructional content (Etcuban & Pagaran 2025). This is followed by the respondents' belief that assessment tasks reflect their true understanding of the topics (3.11), reinforcing the importance of meaningful and aligned assessments in measuring conceptual mastery and academic competence. The respondents' confidence in completing homework, projects, and tests (3.06) aligns with findings that students' Mathematics proficiency is not significantly influenced by teachers' pedagogical content knowledge and self-efficacy, suggesting that learners' academic confidence is more strongly shaped by a combination of assessment experiences, learner factors, and broader educational conditions rather than teacher characteristics alone (Anyeta & Suglo, 2024).

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4. Learning difficulties do JHS students encounter in understanding fundamental Mathematics skills

Table 11
Learning Difficulties of JHS Students Encountered in Understanding Fundamental Mathematics Concepts

Item	Weighted Mean	Verbal Interpretation	Rank
Weak foundation in basic operations	3.71	Strongly Agree	3
Poor number sense	3.72	Strongly Agree	2
Difficulty in solving word problems	3.54	Strongly Agree	5
Lack of problem-solving strategies	3.66	Strongly Agree	4
Math anxiety	3.78	Strongly Agree	1
Poor understanding of mathematical concepts	3.52	Strongly Agree	6
Weak comprehension skills	3.42	Agree	9
Computational errors	3.49	Agree	7
Difficulty with mathematical symbols and notation	3.38	Agree	10
Lack of practice and motivation	3.48	Agree	8
Composite Mean	**3.57**	**Strongly Agree**	

The table shows the learning difficulties that JHS students encounter in understanding fundamental Mathematics skills. It presents a composite weighted mean of 3.57, indicating that the respondents strongly agree. Furthermore, the table presents the three highest weighted means of 3.78, 3.72, and 3.71, which imply math anxiety, poor number sense, and a weak foundation in basic operations. On the other hand, the three least weighted means of 3.38, 3.42, and 3.48 imply difficulty with mathematical symbols and notation, weak comprehension skills, and a lack of practice and motivation.

The high level of agreement regarding learning difficulties (3.57) aligns with research on developmental dyscalculia, which emphasizes that persistent Mathematics difficulties may reflect a spectrum of underlying cognitive and neurological differences as well as cumulative knowledge gaps and psychological barriers, highlighting the need to understand individual differences in mathematical ability rather than viewing learning difficulties as a single uniform issue (Zoccolotti & Melogno, 2024). The identification of math anxiety (3.78), poor number sense (3.72), and a weak foundation in basic operations (3.71) as the most significant challenges is supported by findings that emphasize that whoever experience high levels of anxiety often struggle to focus, process mathematical concepts, and apply problem-solving strategies effectively (Chandel, 2025). Furthermore, while difficulty with symbols (3.38), comprehension (3.42), and lack of motivation (3.48) were rated lower, their presence still validates contemporary "Holistic Difficulty Frameworks," which suggest that even proficient students struggle when abstract notations and inconsistent practice habits impede the deep internalization of mathematical concepts (Global STEM Education Journal, 2026).

5. Based on the results of the study, what enhancement activities may be proposed?

Based on the study's findings, intervention activities are proposed to further enhance the fundamental skills and academic performance in Mathematics of grade 8 students.

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LEARNING MODULE

TOPIC 1: Improving Algebraic Concepts: Simplifying and Solving Algebraic Expressions and Equations

Objectives

At the end of the module, the learners are expected to:

1. Identify variables, constants, coefficients, and terms in algebraic expressions.
2. Simplify algebraic expressions using the properties of operations.
3. Solve one-step and two-step linear equations accurately.
4. Apply algebraic concepts in solving real-life word problems.
5. Develop confidence and active participation in solving algebraic tasks.

Materials Required

- Mathematics Learner's Module for Grade 8
- Whiteboard and marker
- Flashcards containing algebraic expressions
- Activity worksheets
- Algebra tiles or cut-out manipulatives
- Calculator (optional)
- Manila paper/Cartolina
- Pens and Notebooks
- Multimedia presentation/Video lessons

Suggested Strategies

- Collaborative Learning
- Guided Discovery Approach
- Drill and Practice
- Peer Tutoring
- Think-Pair-Share
- Problem-Based Learning
- Use of Manipulatives and Visual Models
- Differentiated Instruction

Concept and Content

Lesson 1: Introduction to Algebraic Expressions

Concept

Algebraic expressions are mathematical phrases that contain variables, constants, coefficients, and operations. Understanding these parts helps learners simplify and solve mathematical problems.

Content Discussion

- Definition of variable, coefficient, constant, and term
- Types of algebraic expressions
- Translating verbal phrases into algebraic expressions

Suggested Activity: "Expression Match-Up"

Students match algebraic expressions with their corresponding verbal phrases using flashcards.

Example:

- "Five more than a number" → x + 5
- "Twice a number decreased by 3" → 2x – 3

Assessment

Direction: Identify the parts of the following algebraic expressions. Write the terms, variables, coefficients, and constant term of each expression.

1. $3x + 5y - 7$
2. $4a - 9b + 12$
3. $7m + 2n - 15$
4. $6p - 3q + 8r - 10$

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5. $2x + 11y - 4z + 9$

Lesson 2: Simplifying Algebraic Expressions
Concept
Simplifying expressions involves combining like terms and applying the properties of operations.
Content Discussion

- Like and unlike terms
- Combining like terms
- Distributive Property

Suggested Activity: "Algebra Relay"
Groups solve simplification problems on the board relay-style.
Example:

$$4x + 3x - 2 + 5 = 7x + 3$$

Guided Practice

1. $4x + 3x - 2 + 5$
2. $6a + 2a - 7 + 9$
3. $5m - 3m + 8 - 4$
4. $7p + p - 10 + 6$

Assessment
Direction: Simplify the following algebraic expressions by combining like terms.

1. $5a + 2a - 6 + 8$
2. $3x + 7x - 4 + 9$
3. $6m - 2m + 5 - 1$
4. $8p + 4p - 10 + 3$
5. $9y - 5y + 12 - 7$

Lesson 3: Solving Linear Equations
Concept
Linear equations can be solved by applying inverse operations while maintaining equality on both sides.
Content Discussion

- One-step equations
- Two-step equations
- Checking solutions

Suggested Activity: "Solve Me Board Game"
Students roll dice and solve equations based on corresponding spaces on the board.
Example:

$$x + 7 = 15$$

Guided Practice

1. $x + 7 = 15$
2. $a - 5 = 12$
3. $m + 9 = 21$
4. $p - 8 = 16$

Assessment
Direction: Solve the following linear equations.

1. $2x - 4 = 10$

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2. $3a + 5 = 20$
3. $5m - 7 = 18$
4. $4p + 9 = 25$
5. $6y - 12 = 24$

Lesson 4: Algebra in Real-Life Situations

Concept

Algebra can be applied in solving everyday problems involving unknown quantities.

Content Discussion

- Translating word problems into equations
- Solving practical algebra problems

Suggested Activity: "Math in Daily Life"

Students solve contextualized word problems related to shopping, age, and distance.

Example:

"Maria bought 3 notebooks and paid ₱120. If each notebook costs the same amount, how much does one notebook cost?"

Equation:

$$3x = 120$$

Guided practice

1. $3x = 120$
2. $4a = 84$
3. $5m = 150$
4. $6p = 210$

Direction: Create and solve one real-life algebraic problem for each situation given below.

1. Maria bought some notebooks worth ₱25 each. She also paid ₱40 for a pen. Her total bill was ₱190.
    - Create an algebraic equation and solve for the number of notebooks bought.
2. A tricycle driver earns ₱150 plus ₱20 for every passenger he transports. If he earned ₱350 in one day,
    - Create an equation and determine the number of passengers he had.
3. John is twice as old as his younger brother. The sum of their ages is 24 years old.
    - Create an algebraic equation and solve for their ages.

Quiz on Algebraic Expressions and Equations

Direction: Answer the following questions carefully.

A. Identify the parts of the algebraic expression.

1. Identify the terms, variables, coefficients, and constant in:

$$4x + 6y - 9$$

2. Identify the terms and variables in:

$$7a - 3b + 12$$

B. Simplify the following algebraic expressions.

3. $5x + 3x - 4 + 9$
4. $8m - 2m + 7 - 5$

C. Solve the following linear equations.

5. $x + 9 = 20$
6. $4a = 36$

D. Solve the word problem.

7. Ana bought several pens worth ₱15 each. She spent a total of ₱120.
   Write an equation and determine the number of pens bought.

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Group Activity Performance
Activity Title: *Algebra Challenge Relay*
Directions:

1. Group the class into 4–5 members.
2. Each group will solve a set of algebraic expressions and equations written on activity cards.
3. The group must:
    - Identify parts of algebraic expressions,
    - Simplify expressions,
    - Solve equations, and
    - Present one real-life algebra problem with solution.
4. The first group to correctly complete all tasks earns additional points.

Criteria for Scoring:

- Accuracy of Answers – 40%
- Teamwork and Cooperation – 30%
- Presentation and Explanation – 20%
- Participation of Members – 10%

Participation During Discussions
Students will be evaluated based on the following:

Criteria	Description
Active Participation	Contributes ideas and answers during discussion
Cooperation	Works well with classmates and group members
Preparedness	Brings needed materials and completes tasks
Attentiveness	Listens carefully and follows instructions

Word Problem-Solving Task
Direction: Read and solve each problem. Write the equation used and show your solution.

1. A school canteen sells sandwiches for ₱25 each. If the total sales amounted to ₱300, how many sandwiches were sold?
2. A taxi charges ₱50 base fare plus ₱12 per kilometer traveled. If the total fare was ₱170, how many kilometers were traveled?
3. John saved ₱40 weekly. After several weeks, he had ₱520. How many weeks did he save?
4. The sum of two consecutive numbers is 35. Find the numbers.
5. Maria is 5 years older than her sister. Their combined age is 27. Find their ages.

Enrichment Activity
"Peer Tutor Hour"
Students with higher mastery assist classmates in solving algebra exercises and explaining solutions step-by-step.

Math Empowerment Seminar: Strengthening Engagement, Confidence, and Fundamental Skills Among Learners

TOPIC 1: Active Participation and Engagement in Mathematics Learning
Objectives
At the end of the seminar, the students are expected to:

1. Recognize the importance of active participation in Mathematics classes.

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2. Demonstrate confidence in sharing ideas and answering mathematical questions.
3. Participate actively in collaborative Mathematics activities.
4. Develop positive communication and teamwork skills during class discussions.

Materials Required

- LCD projector and laptop
- Activity sheets
- Whiteboard and markers
- Meta cards/manila paper
- Mathematics flashcards
- Sticky notes
- Tokens or reward cards

Suggested Strategies

- Think-Pair-Share
- Cooperative Learning
- Group Problem Solving
- Interactive Discussion
- Peer Tutoring
- Gamification Activities

Concept

Instructional participation enhances learners' understanding, confidence, and classroom engagement. Students learn more effectively when they actively communicate, collaborate, and participate in mathematical discussions and activities.

Content

- Importance of classroom participation
- Barriers to participation in Mathematics
- Building confidence in answering and asking questions
- Collaborative learning techniques
- Positive classroom interaction strategies

Seminar Activities

Activity 1: "Math Talk Challenge"

Students explain how they solved a math problem in front of a small group.

Activity 2: "Group Puzzle Relay"

Groups solve Mathematics puzzles collaboratively and present solutions.

Puzzle 1: Mystery Variables

Replace the symbols with the correct variables or numbers.

1. $3\square + 5 = 20$
2. $7x + \triangle = 19$
3. $\heartsuit + 4y = 24$

Puzzle 2: Simplification Riddle

Simplify the expression to discover the secret answer.

Expression	Simplified Form
$6x + 4x$	_____
$8a - 3a$	_____
$7m + 2 - 5$	_____

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Riddle:
"I am the answer when $5x + 5x =$_____."

Puzzle 3: True or False?
Determine whether the given value makes the equation true.

1. Does $x = 4$ satisfy
$$2x + 3 = 11$$
2. Does $a = 5$ satisfy
$$3a - 2 = 13$$

Puzzle 4: Fare Puzzle
A tricycle fare costs ₱15 plus ₱10 per kilometer traveled. The total fare was ₱75.

- Write an equation.
- Solve for the number of kilometers traveled.

Activity 3: "Question Box"
Students anonymously submit questions about difficult math topics for open discussion.

Topic 2: Building Confidence and Reducing Anxiety in Mathematics
Objectives
At the end of the seminar, the students are expected to:

1. Identify causes and effects of math anxiety.
2. Develop positive attitudes toward Mathematics learning.
3. Apply coping strategies to reduce fear and stress during math activities.
4. Increase self-confidence in solving mathematical problems.

Materials Required

- Audio-visual presentation
- Reflection sheets
- Relaxation music/audio
- Stress balls or simple manipulatives
- Worksheets
- Inspirational quote cards

Suggested Strategies

- Guided Reflection
- Positive Reinforcement
- Mindfulness Activities
- Encouragement and Motivation Sessions
- Interactive Games
- Collaborative Learning

Concept
Math anxiety negatively affects learners' confidence, concentration, and academic performance. Creating a supportive and encouraging learning environment helps students become more confident and motivated in Mathematics.

Content

- Meaning and causes of math anxiety
- Effects of anxiety on learning and performance
- Growth mindset in Mathematics
- Stress management techniques during tests and activities
- Positive study habits and self-motivation

Seminar Activities
Activity 1: "My Math Experience"

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Students share positive and challenging experiences in Mathematics.

Rubric

Students share positive and challenging experiences in Mathematics.

Criteria	Excellent (4)	Good (3)	Fair (2)	Needs Improvement (1)
Content and Ideas	Shares meaningful and detailed experiences related to mathematics clearly and thoughtfully.	Shares relevant experiences with enough details.	Shares limited or unclear experiences.	Shares very minimal or unrelated ideas.
Clarity of Expression	Speaks clearly and confidently with well-organized thoughts.	Speaks clearly most of the time with understandable ideas.	Speaks with some difficulty in expressing ideas.	Has difficulty expressing thoughts clearly.
Participation	Actively participates and willingly shares experiences.	Participates with minimal prompting.	Participates only when asked.	Rarely or does not participate.
Reflection and Insight	Demonstrates deep reflection and understanding of personal math experiences.	Shows some reflection and understanding.	Shows limited reflection about experiences.	Shows little or no reflection.
Respect and Listening	Listens attentively and shows respect to classmates during sharing.	Usually listens and shows respect.	Sometimes attentive during sharing.	Frequently inattentive or disruptive.

Scoring Guide

- 16–20 points – Outstanding
- 11–15 points – Very Satisfactory
- 6–10 points – Satisfactory
- 1–5 points – Needs Improvement

Activity 2: “Confidence Circle”

Building Confidence in Mathematics

Objective

To help students develop self-confidence in Mathematics by encouraging positive sharing, peer support, and active participation.

Instructions / Steps to Follow

Step 1: Form a Circle

- The teacher will ask all students to form a large circle inside the classroom.
- Each student should be seated or standing where everyone can see and hear one another clearly.

Step 2: Reflection Time

- Students will be given 2–3 minutes to think about:
    - A Mathematics topic they find easy or enjoyable

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- A challenge they experience in Mathematics
- One thing they want to improve in math

Step 3: Sharing of Experiences

- One by one, students will share their answers using the guide below:
  1. "One thing I am good at in math is…"
  2. "One challenge I experience in math is…"
  3. "One goal I want to achieve in math is…"
- Students are encouraged to speak honestly and respectfully.

Step 4: Confidence Statements

- After sharing, classmates will give positive encouragement such as:
  - "You can do it!"
  - "Keep trying!"
  - "We believe in you!"
- The teacher may also provide motivational feedback to strengthen students' confidence.

Step 5: Partner Encouragement

- Students will pair with a classmate.
- Each pair will write one positive statement or affirmation for their partner related to Mathematics learning.
  Example:
- "You are improving in solving equations."
- "You are capable of learning math step by step."

Step 6: Confidence Commitment

- Each student will complete the sentence:
  "Starting today, I will improve my Mathematics skills by _____."
- Students may write their answers on a small sheet of paper or activity card.
  Expected Output
- Oral sharing of math experiences
- Positive affirmation for a classmate
- Personal confidence commitment statement
  Teacher's Role
- Facilitate respectful discussion
- Encourage shy students to participate
- Create a safe and supportive learning environment
- Reinforce positive attitudes toward Mathematics

Topic 3: Enhancing Fundamental Mathematics Skills Through Reinforcement Activities

Objectives

At the end of the seminar, the students are expected to:

1. Improve mastery of basic mathematical operations and concepts.
2. Apply foundational skills in solving mathematical problems accurately.
3. Develop fluency in performing basic computations.
4. Strengthen problem-solving and analytical thinking skills.

Materials Required

- Drill worksheets
- Flashcards
- Multiplication charts
- Number lines
- Calculators (optional)

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- Manipulative materials
- Visual aids and activity cards

Suggested Strategies

- Drill and Practice
- Remediation Sessions
- Peer Tutoring
- Demonstration Method
- Guided Practice
- Use of Visual Representations and Manipulatives

Concept

Strong foundational skills are essential for success in higher Mathematics. Mastery of basic operations, fractions, decimals, integers, and algebraic concepts allows learners to solve complex problems more effectively and confidently.

Content

- Review of basic operations
- Fractions and decimals
- Integer operations
- Algebraic expressions and equations
- Problem-solving techniques

Seminar Activities

Activity 1: "Basic Skills Drill Race"

Students answer timed computation drills individually and in groups.

Activity 2: "Math Stations"

Learners rotate through stations focusing on fractions, integers, algebra, and word problems.

Station 1: Fraction Fun Station

Focus: Fractions

Activities at this Station:

- Identifying proper, improper, and mixed fractions
- Comparing and arranging fractions
- Adding and subtracting fractions
- Matching fraction cards with visual models

Sample Task:

Solve:

$$\frac{2}{5}+\frac{1}{5}$$

Materials:

- Fraction cards
- Visual fraction strips
- Worksheets
- Manipulatives

Station 2: Integer Challenge Station

Focus: Integers

Activities at this Station:

- Identifying positive and negative integers
- Using number lines
- Adding and subtracting integers

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- Solving integer puzzles
  Sample Task:

$$-8 + 12 = \ ?$$

  Materials:
- Integer chips
- Number line posters
- Activity cards
- Marker boards

  Station 3: Algebra Explorer Station
  Focus: Algebraic Expressions and Equations
  Activities at this Station:
- Identifying variables, coefficients, and constants
- Simplifying algebraic expressions
- Solving one-step equations
- Algebra matching games
  Sample Task:

$$3x + 5 = 20$$

  Materials:
- Algebra tiles
- Equation cards
- Worksheets
- Flashcards
  Station 4: Word Problem Solving Station
  Focus: Real-Life Problem Solving
  Activities at this Station:
- Translating situations into equations
- Solving real-life math problems
- Identifying key words and operations
- Group discussion of solutions

  Sample Task:
  "A tricycle driver earns ₱50 plus ₱10 per passenger. If he earned ₱150, how many passengers did he have?"
  Materials:
- Problem cards
- Worksheets
- Pens and papers
- Graphic organizers
  Rotation Procedure

1. Students are grouped equally.
2. Each group spends 10–15 minutes per station.
3. After the timer ends, groups rotate to the next station.
4. Students must complete the activity sheet before moving.
5. The teacher facilitates and monitors each station.

  Activity 3: "Peer Coaching"
  High-performing students assist classmates in solving practice exercises step-by-step.

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Discussion

The findings of the study revealed that Grade 8 students of As-is Integrated School generally demonstrated a confident level of mastery in fundamental Mathematics skills and a very good level of academic performance. Students showed strength in number sense, basic operations, and participation in collaborative classroom activities, indicating that they possess adequate foundational competencies necessary for learning higher mathematical concepts. The findings further support previous studies emphasizing that strong foundational skills contribute significantly to students' mathematical understanding, problem-solving abilities, and academic achievement.

The study also revealed that students were generally proficient in learning content, instructional activities, and assessment tasks. Learners were able to understand classroom lessons, apply mathematical concepts during assessments, and benefit from instructional materials and collaborative learning strategies. These findings suggest that learner-centered instructional approaches, engaging classroom activities, and meaningful participation positively influence students' confidence, engagement, and performance in Mathematics.

Despite these positive findings, the study identified several learning difficulties encountered by students, particularly math anxiety, poor number sense, weak foundational skills in basic operations, and difficulties in algebraic concepts. These challenges negatively affected students' confidence and ability to solve mathematical problems effectively, especially in more complex tasks involving algebra and problem-solving strategies. Therefore, the findings imply the need for continuous reinforcement activities, remediation programs, peer tutoring, and Mathematics intervention seminars to strengthen students' foundational skills, reduce math anxiety, and improve their overall academic performance in Mathematics.

Conclusion

Based on the findings of the study, the researcher came up with the following conclusions:

1. Junior High School students demonstrate a *Confident* level of mastery in fundamental Mathematics skills, with number sense as the strongest area and algebraic concepts as the weakest, indicating the need for further improvement in algebraic skills.

2. Academic performance of Junior High School students in Mathematics is generally *Very Good*, with quarterly grades as the strongest indicator and test scores as the lowest, suggesting comparatively lower confidence during formal assessments.

3. Students' proficiency in Mathematics is generally *Proficient*, with learning content as the strongest area and instructional activities as the lowest, indicating comparatively lower engagement in instructional strategies.

4. Junior High School students *Strongly Agree* that they experience learning difficulties in fundamental Mathematics skills, with math anxiety, poor number sense, and a weak foundation in basic operations as the most significant challenges.

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