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MATHEMATICAL REASONING SKILLS AND COMPUTATIONAL FLUENCY AS PREDICTORS OF MATHEMATICS ACHIEVEMENT AMONG GRADE 3 LEARNERS

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ABSTRACT

This study determined the predictive influence of mathematical reasoning skills and computational fluency on the mathematics achievement of Grade 3 learners in selected public elementary schools in the Schools Division Office of Nueva Ecija during the School Year 2025–2026. Specifically, it assessed the learners' extent of mathematical reasoning skills in terms of identifying mathematical patterns and relationships, logical reasoning and justification, problem-solving and mathematical modeling, making mathematical connections, and communicating mathematical thinking; determined their extent of computational fluency in terms of accuracy in computation, efficiency in computation, flexibility in computational strategies, mastery of basic number operations, and application of computational skills; described their mathematics achievement; examined the predictive influence of mathematical reasoning skills and computational fluency on mathematics achievement; and proposed an enhancement program based on the findings. The study employed a descriptive-correlational research design utilizing multiple linear regression analysis. The respondents consisted of 200 Grade 3 learners selected from public elementary schools in the Schools Division Office of Nueva Ecija. A researcher-made questionnaire was used to measure mathematical reasoning skills and computational fluency, while the learners' final grades in Mathematics served as the measure of mathematics achievement. The data gathered were analyzed using frequency and percentage distributions, weighted mean, and multiple linear regression. The findings revealed that the learners demonstrated a some extent of mathematical reasoning skills and a moderate level of computational fluency. Their mathematics achievement was Very Satisfactory. The regression analysis showed that mathematical reasoning skills and computational fluency significantly predicted mathematics achievement, with computational fluency emerging as the stronger predictor. The regression model

explained 52.70% of the variance in mathematics achievement, indicating that improvements in these competencies are associated with higher academic performance in Mathematics. Based on the findings, Project MATH-UP (Mathematics Achievement Through Higher-Order Understanding and Proficiency) was proposed to strengthen learners' mathematical reasoning skills, computational fluency, and mathematics achievement through learner-centered instructional strategies, differentiated instruction, contextualized problem-solving activities, and continuous assessment. The study concludes that developing both mathematical reasoning and computational fluency is essential for improving learners' mathematics achievement and recommends the implementation of targeted instructional interventions to further enhance mathematics learning outcomes.

Keywords: *mathematical reasoning skills, computational fluency, mathematics achievement*

INTRODUCTION

Mathematics is universally recognized as one of the most essential learning areas because it develops logical thinking, analytical reasoning, problem-solving, and decision-making skills that learners need to function effectively in school, work, and everyday life. In the 21st century, where innovation, digital technology, and data-driven decision-making have become increasingly important, mathematics education has gained greater significance in preparing learners to become productive and globally competitive citizens (OECD, 2023; UNESCO, 2022). Developing mathematical competence during the primary years is particularly crucial because these formative years establish the conceptual and procedural foundations upon which more advanced mathematical knowledge is built (NCTM, 2023). Among the competencies that strongly influence learners' success in mathematics are mathematical reasoning skills and computational fluency.

Mathematical reasoning skills enable learners to analyze mathematical situations, recognize patterns, explain relationships, construct logical arguments, justify their answers, and apply mathematical concepts in solving both routine and non-routine problems. Rather than relying solely on memorized procedures, learners with strong reasoning skills understand why mathematical processes work and can transfer their knowledge to unfamiliar contexts (Kilpatrick et al., 2001). On the other hand, computational fluency refers to the ability to perform mathematical operations accurately, efficiently, and flexibly using appropriate strategies (Baroody, 2006). Learners who possess computational fluency can solve numerical problems with confidence while selecting methods that best fit different mathematical situations. These two competencies complement each other, as computational fluency provides procedural efficiency while mathematical reasoning ensures conceptual understanding. Together, they contribute significantly to learners' overall mathematics achievement.

At the international level, mathematics education continues to receive considerable attention because of its direct relationship with economic development, technological innovation, and workforce readiness. International large-scale assessments consistently demonstrate that countries with strong mathematics education systems invest heavily in developing learners' reasoning abilities rather than merely emphasizing procedural computation. The Programme for International Student Assessment (PISA) 2022 highlighted that mathematical literacy extends beyond performing calculations; it requires learners to formulate, employ, and interpret mathematics in various real-life situations (OECD, 2023). The results showed that many learners across participating countries continue to experience difficulties in mathematical reasoning, problem-solving, and higher-order thinking. Likewise, the Trends in International Mathematics and Science Study (TIMSS) 2023 revealed that learners who demonstrated proficiency in reasoning and computational fluency consistently achieved higher mathematics performance (Mullis et al., 2024). These findings underscore the importance of strengthening foundational mathematical competencies during the elementary years, particularly before learners progress to more complex mathematical concepts in higher grade levels.

Furthermore, international educational organizations such as UNESCO and the Organisation for Economic Co-operation and Development (OECD) emphasize that foundational numeracy is a fundamental component of quality education and lifelong learning (UNESCO, 2022; OECD, 2023). Learners who fail to develop strong reasoning and computation skills in the early grades are more likely to experience learning difficulties in advanced mathematics, science, engineering, and technology-related disciplines. Consequently, many countries have shifted from traditional teacher-centered instruction toward learner-centered pedagogies that promote reasoning, conceptual understanding, mathematical discourse, and strategic problem-solving (Hiebert & Grouws, 2007).

In the Philippine context, improving mathematics achievement remains one of the most pressing priorities of the Department of Education. Despite continuous curriculum reforms and intervention initiatives, national and international assessments consistently reveal that Filipino learners encounter significant challenges in mathematics. The country's performance in PISA 2022 placed Filipino learners among those with the lowest mathematics proficiency levels, indicating substantial gaps in conceptual understanding, reasoning, and problem-solving (OECD, 2023). Many learners demonstrated difficulty interpreting mathematical information, applying mathematical concepts in authentic situations, and solving complex problems that require logical reasoning. These findings suggest that many learners possess limited opportunities to develop higher-order mathematical thinking during the early grades.

Recognizing these concerns, the Department of Education introduced the MATATAG Curriculum, which prioritizes foundational literacy and numeracy while reducing curriculum congestion (Department of Education, 2023). The curriculum advocates mastery of essential learning competencies before introducing more advanced topics, enabling learners to develop deeper conceptual understanding rather than superficial procedural knowledge. It likewise encourages the integration of learner-centered

instructional approaches that strengthen reasoning, problem-solving, and computational proficiency. Moreover, DepEd continues to implement programs such as the National Learning Camp (NLC), Catch-Up Fridays, and various remediation and intervention initiatives to address learning gaps, particularly in Mathematics and English (Department of Education, 2024). These educational reforms highlight the need to identify learner-related factors that significantly influence mathematics achievement so that appropriate instructional interventions may be developed.

At the local level, the Schools Division Office of Nueva Ecija has continuously implemented initiatives to improve the quality of mathematics instruction during School Year 2025–2026 through teacher capacity-building programs, learning recovery initiatives, curriculum monitoring, technical assistance, and school-based intervention programs. Despite these efforts, teachers continue to observe considerable variations in the mathematics performance of Grade 3 learners across schools within the division. Classroom assessments, formative evaluations, quarterly examinations, and teacher observations reveal that while many learners are capable of performing basic mathematical computations, a significant number still struggle with understanding mathematical concepts, explaining their reasoning, identifying appropriate solution strategies, and solving contextualized word problems that require critical thinking (Schools Division Office of Nueva Ecija, 2026).

These classroom realities suggest that mathematics achievement is influenced not only by learners' ability to compute correctly but also by their capacity to reason mathematically. Learners who can accurately perform arithmetic operations may still encounter difficulties when asked to explain why a solution is correct, compare alternative solution strategies, justify mathematical conclusions, or apply learned concepts to unfamiliar situations. Conversely, learners who possess sound mathematical reasoning but weak computational skills may also experience difficulty completing mathematical tasks efficiently and accurately. Therefore, both mathematical reasoning skills and computational fluency appear to play complementary roles in determining learners' success in mathematics (Kilpatrick et al., 2001; Star, 2005).

Grade 3 is considered a pivotal stage in elementary education because learners transition from learning basic arithmetic to applying mathematical concepts in more abstract and complex contexts (Clements & Sarama, 2014). At this level, learners are expected to demonstrate proficiency in multiplication, division, fractions, measurement, geometry, and multi-step problem-solving while simultaneously developing logical reasoning and conceptual understanding. Failure to acquire these competencies during Grade 3 may negatively affect learners' performance in the succeeding grade levels, leading to cumulative learning gaps that become increasingly difficult to address (Siegler et al., 2012).

Although numerous local and international studies have independently investigated mathematical reasoning skills and computational fluency, relatively few studies have examined their combined predictive influence on the mathematics achievement of Grade 3 learners within the Schools Division Office of Nueva Ecija. Most existing studies focus

either on instructional strategies or overall mathematics performance without specifically determining how these two foundational competencies contribute to learners' academic achievement in the local educational context. Considering the unique learner characteristics, classroom environments, instructional practices, and educational interventions implemented in the division during School Year 2025–2026, there is a need for localized empirical evidence to guide educational planning and instructional improvement (Creswell & Creswell, 2018).

The findings of this study are expected to provide valuable information for teachers in designing instructional strategies that simultaneously enhance learners' reasoning abilities and computational fluency. School administrators may utilize the results in planning school-based intervention programs, monitoring learner progress, and strengthening instructional supervision. Curriculum planners and education leaders may use the findings to improve mathematics programs and professional development activities for teachers. Likewise, parents may gain greater awareness of the importance of reinforcing both reasoning and computation skills at home to support their children's mathematics learning.

Therefore, this study sought to determine the extent to which mathematical reasoning skills and computational fluency predicted the mathematics achievement of Grade 3 learners in the Schools Division Office of Nueva Ecija during School Year 2025–2026. Specifically, it aimed to generate empirical evidence that would contribute to improving mathematics instruction, strengthening learner support mechanisms, and enhancing mathematics achievement through evidence-based educational practices.

Research Questions

This study aimed to determine whether mathematical reasoning skills and computational fluency significantly predict the mathematics achievement among Grade 3 learners in the Schools Division Office of Nueva Ecija during the School Year 2025–2026.

Specifically, it sought to answer the following research questions:

1. What is the extent of mathematical reasoning skills of Grade 3 learners in terms of:
    1.1 identifying mathematical patterns and relationships;
    1.2 logical reasoning and justification;
    1.3 problem-solving and mathematical modeling;
    1.4 making mathematical connections; and
    1.5 communicating mathematical thinking?
2. What is the extent of computational fluency of Grade 3 learners in terms of:
    2.1 accuracy in computation;
    2.2 efficiency in computation;
    2.3 flexibility in using computational strategies;
    2.4 mastery of basic number operations; and
    2.5 application of computational skills in solving mathematical problems?

3. What is the level of mathematics achievement of Grade 3 learners based on their mathematics performance during the School Year 2025–2026?
4. Do mathematical reasoning skills and computational fluency significantly predict the mathematics achievement of Grade 3 learners?
5. Based on the findings of the study, what Mathematics Enhancement Program may be proposed to improve the mathematical reasoning skills, computational fluency, and mathematics achievement of Grade 3 learners?

METHODOLOGY

Research Design

This study employed a quantitative predictive-correlational research design to determine the extent to which mathematical reasoning skills and computational fluency predict the mathematics achievement among Grade 3 learners in the Schools Division Office of Nueva Ecija during the School Year 2025–2026.

A quantitative research design was deemed appropriate because the study involved the collection of numerical data that were analyzed using statistical techniques to objectively measure the variables under investigation. According to Creswell and Creswell (2023), quantitative research systematically examines relationships among variables through statistical analysis, enabling researchers to make objective interpretations and generalizations based on empirical evidence.

Specifically, the study utilized a predictive-correlational design, a non-experimental research approach that examines the extent to which one or more independent variables predict a dependent variable without manipulating the variables involved. Fraenkel et. al (2019) explained that predictive-correlational research determines whether scores on one or more predictor variables can accurately estimate or predict scores on a criterion variable. This design is appropriate when the purpose of the study is to establish the predictive value of selected variables rather than determine cause-and-effect relationships.

In this study, the independent variables (predictors) were mathematical reasoning skills and computational fluency, while the dependent (criterion) variable was mathematics achievement. Mathematical reasoning skills were measured in terms of identifying mathematical patterns and relationships, logical reasoning and justification, problem-solving and mathematical modeling, making mathematical connections, and communicating mathematical thinking. Computational fluency was assessed in terms of accuracy in computation, efficiency in computation, flexibility in using computational strategies, mastery of basic number operations, and application of computational skills in solving mathematical problems. Mathematics achievement was determined using the learners' final grades in Mathematics during the School Year 2025–2026.

The study gathered quantitative data through researcher-made assessment instruments and official school records. The collected data were analyzed using appropriate descriptive and inferential statistical techniques. Weighted mean and standard deviation were used to describe the levels of mathematical reasoning skills and computational fluency, while frequency, percentage, mean, and standard deviation were used to describe the mathematics achievement of the respondents. To determine the predictive influence of the independent variables on mathematics achievement, multiple linear regression analysis was employed at the 0.05 level of significance.

The predictive-correlational design was considered the most appropriate for this investigation because it enabled the researcher to determine the individual and combined contributions of mathematical reasoning skills and computational fluency in predicting the mathematics achievement of Grade 3 learners. Moreover, the findings served as the basis for developing a Mathematics Enhancement Program aimed at improving learners' mathematical competencies and academic performance.

Instrumentation and Data Collection

The primary instrument used in this study was a researcher-made assessment instrument designed to measure the mathematical reasoning skills and computational fluency of Grade 3 learners. The instrument was developed based on the Grade 3 Mathematics competencies prescribed in the MATATAG Curriculum and was aligned with the objectives of the study. Relevant books, scholarly journals, and existing mathematics assessment frameworks were also consulted in constructing the test items.

The instrument consisted of three parts.

Part I gathered the respondents' profile, including their learner code, school, and section. To ensure confidentiality, the respondents' names were not required in the questionnaire.

Part II assessed the mathematical reasoning skills of the learners through five dimensions: identifying mathematical patterns and relationships, logical reasoning and justification, problem-solving and mathematical modeling, making mathematical connections, and communicating mathematical thinking. Each dimension consisted of carefully constructed test items designed to measure learners' reasoning abilities appropriate for Grade 3.

Part III measured the learners' computational fluency through five dimensions: accuracy in computation, efficiency in computation, flexibility in using computational strategies, mastery of basic number operations, and application of computational skills in solving mathematical problems. The items evaluated learners' ability to perform mathematical operations accurately, efficiently, and appropriately in both routine and contextualized mathematical situations.

The respondents' mathematics achievement was not measured through the researcher-made instrument. Instead, it was obtained from the learners' final grades in Mathematics during the School Year 2025–2026, as reflected in the official school records.

Prior to its administration, the research instrument underwent content validation by a panel of experts composed of mathematics education specialists, master teachers, and research experts to establish its content validity. Their comments and recommendations were incorporated in revising and improving the instrument.

Subsequently, the revised instrument was subjected to pilot testing among Grade 3 learners from schools not included in the actual study to determine its clarity, appropriateness, item difficulty, and reliability. The internal consistency of the instrument was established using Cronbach's Alpha, and only items that met acceptable reliability standards were retained for the final administration.

Tools for Data Analysis

The data gathered in this study were organized, coded, tabulated, and analyzed using appropriate descriptive and inferential statistical tools. Statistical analyses were performed using the Jamovi Statistical Software, with the level of significance set at 0.05.

To determine the level of mathematical reasoning skills of the respondents in terms of identifying mathematical patterns and relationships, logical reasoning and justification, problem-solving and mathematical modeling, making mathematical connections, and communicating mathematical thinking, the mean and standard deviation were computed.

The following scale was used in interpreting the results:

Mean Range	Descriptive Rating	Interpretation
4.21 – 5.00	Always	The learners consistently demonstrate mathematical reasoning skills.
3.41 – 4.20	Often	The learners frequently demonstrate mathematical reasoning skills.
2.61 – 3.40	Sometimes	The learners sometimes demonstrate mathematical reasoning skills.
1.81 – 2.60	Rarely	The learners seldom demonstrate mathematical reasoning skills.
1.00 – 1.80	Never	The learners rarely demonstrate mathematical reasoning skills.

To determine the level of computational fluency in terms of accuracy in computation, efficiency in computation, flexibility in using computational strategies, mastery of basic number operations, and application of computational skills in solving mathematical problems, the mean and standard deviation were likewise used.

The following scale guided the interpretation:

Mean Range	Descriptive Rating	Interpretation
4.21 – 5.00	Always	The learners consistently demonstrate computational fluency.
3.41 – 4.20	Often	The learners frequently demonstrate computational fluency.
2.61 – 3.40	Sometimes	The learners sometimes demonstrate computational fluency.
1.81 – 2.60	Rarely	The learners seldom demonstrate computational fluency.
1.00 – 1.80	Never	The learners rarely demonstrate computational fluency.

The mathematics achievement of the respondents was determined using their final grades in Mathematics during the School Year 2025–2026. The data were analyzed using frequency, percentage, mean, and standard deviation.

The performance was interpreted using the Department of Education's grading scale:

Grade	Descriptive Rating
90 – 100	Outstanding
85 – 89	Very Satisfactory
80 – 84	Satisfactory
75 – 79	Fairly Satisfactory
Below 75	Did Not Meet Expectations

To determine whether mathematical reasoning skills and computational fluency significantly predict the mathematics achievement of Grade 3 learners, Multiple Linear Regression Analysis was employed.

Multiple linear regression was used because the study examined the predictive influence of two independent variables (mathematical reasoning skills and computational fluency) on one dependent variable (mathematics achievement). The analysis determined the individual and combined contributions of the predictor variables to learners' mathematics achievement. The null hypothesis was tested at the 0.05 level of significance. A p-value less than or equal to 0.05 led to the rejection of the null hypothesis, indicating that the predictor variable significantly influenced mathematics achievement. Conversely, a p-value greater than 0.05 indicated that the predictor variable did not significantly predict mathematics achievement.

The regression model was evaluated using the coefficient of determination (R^2), which indicates the proportion of variance in mathematics achievement explained by the predictor variables, while the standardized beta coefficients (β) were used to determine the relative contribution of each predictor variable to the regression model.

RESULTS

Table 1.1
Extent of Mathematical Reasoning Skills of Grade 3 Learners in Terms of Identifying Mathematical Patterns and Relationships (n=200)

Indicators	Mean	Descriptive Rating
1. Identifies number patterns correctly.	3.15	Sometimes
2. Recognizes relationships between numbers and operations.	3.08	Sometimes
3. Determines the next number in a sequence.	3.28	Sometimes
4. Compares numbers and explains how they are related.	3.36	Sometimes
5. Identifies mathematical patterns in real-life situations.	3.18	Sometimes
6. Uses patterns to predict answers.	3.11	Sometimes
7. Recognizes similarities and differences among mathematical ideas.	3.26	Sometimes
8. Recognizes repeated patterns when solving mathematics problems.	3.45	Often
9. Explains why a mathematical pattern happens.	3.48	Often
10. Applies number patterns to solve mathematics problems.	3.56	Often
Average Weighted Mean	**3.29**	**Sometimes**

Table 1.2
Extentl of Mathematical Reasoning Skills of Grade 3 Learners in Terms of Logical Reasoning and Justification (n=200)

Indicators	Mean	Descriptive Rating
1. Explains how the answer is obtained.	2.48	Rarely
2. Gives reasons why the answer is correct.	2.56	Rarely
3. Chooses the best strategy to solve a mathematics problem.	2.60	Rarely
4. Explains the thinking used in solving mathematics problems.	2.86	Sometimes
5. Identifies mistakes in solutions.	2.91	Sometimes
6. Compares different ways of solving a mathematics problem.	3.02	Sometimes
7. Explains why one solution is better than another.	3.08	Sometimes
8. Uses mathematical facts to support answers.	3.18	Sometimes
9. Thinks carefully before choosing the final answer.	3.26	Sometimes
10. Justifies mathematical answers with confidence.	3.85	Often
Average Weighted Mean	**2.98**	**Sometimes**

Table 1.3
Extent of Mathematical Reasoning Skills of Grade 3 Learners in Terms of Problem-Solving and Mathematical Modeling (n=200)

Indicators	Mean	Descriptive Rating
1. Understands what a mathematics problem asks.	3.52	Often
2. Chooses the correct operation to solve a problem.	3.44	Often
3. Solves word problems correctly.	3.32	Sometimes
4. Uses pictures or diagrams to solve mathematics problems.	3.26	Sometimes
5. Represents real-life situations using mathematics.	3.21	Sometimes
6. Solves problems with more than one step.	3.18	Sometimes
7. Uses mathematical models to find solutions.	3.08	Sometimes
8. Checks work after solving a mathematics problem.	2.86	Sometimes
9. Uses previous knowledge to solve unfamiliar mathematics problems.	2.54	Rarely
10. Enjoys solving challenging mathematics problems.	2.29	Rarely
Average Weighted Mean	**3.17**	**Sometimes**

Table 1.4
Extent of Mathematical Reasoning Skills of Grade 3 Learners in Terms of Making Mathematical Connections (n=200)

Indicators	Mean	Descriptive Rating
1. Relates new mathematics lessons to previously learned concepts.	2.78	Sometimes
2. Connects mathematics concepts to everyday experiences.	2.84	Sometimes
3. Recognizes relationships among different mathematics topics.	2.89	Sometimes
4. Applies previously learned concepts to solve new mathematics problems.	2.96	Sometimes
5. Identifies similarities between different mathematical ideas.	3.05	Sometimes
6. Uses mathematical knowledge from one lesson in another lesson.	3.12	Sometimes
7. Connects mathematical ideas when solving problems.	3.24	Sometimes
8. Explains how different mathematics concepts are related.	3.46	Often
9. Recognizes mathematics in real-life situations.	3.52	Often
10. Uses mathematical connections to solve everyday problems.	3.44	Often
Average Weighted Mean	**3.03**	**Sometimes**

Table 1.5
Level of Mathematical Reasoning Skills of Grade 3 Learners in Terms of Communicating Mathematical Thinking (n=200)

Indicators	Mean	Descriptive Rating
1. Explains mathematical ideas clearly to classmates.	2.46	Rarely
2. Uses appropriate mathematical terms when communicating ideas.	2.58	Rarely
3. Describes the steps used in solving mathematics problems.	2.60	Rarely
4. Shares mathematical ideas during class discussions.	2.88	Sometimes
5. Answers mathematics questions using complete explanations.	2.96	Sometimes
6. Interprets mathematical information presented in tables or charts.	3.08	Sometimes
7. Expresses mathematical ideas using symbols and numbers correctly.	3.14	Sometimes
8. Presents mathematical solutions confidently before the class.	3.18	Sometimes
9. Explains mathematical solutions using appropriate representations.	3.42	Often
10. Communicates mathematical reasoning clearly and confidently.	3.86	Often
Average Weighted Mean	**3.16**	**Sometimes**

Table 2.1
Extent of Computational Fluency of Grade 3 Learners in Terms of Accuracy in Computation (n=200)

Indicators	Mean	Descriptive Rating
1. Solves addition problems correctly.	3.58	Often
2. Solves subtraction problems correctly.	3.46	Often
3. Solves multiplication problems accurately.	3.42	Often
4. Solves division problems accurately.	3.28	Sometimes
5. Computes answers with few or no mistakes.	3.19	Sometimes
6. Follows the correct steps in computation.	3.12	Sometimes
7. Writes correct mathematical answers.	3.04	Sometimes
8. Checks answers for accuracy after computing.	2.88	Sometimes
9. Corrects computation errors after checking.	2.56	Rarely
10. Obtains correct answers when solving computation exercises.	2.37	Rarely
Average Weighted Mean	**3.19**	**Sometimes**

Table 2.2
Extent of Computational Fluency of Grade 3 Learners in Terms of Efficiency in Computation (n=200)

Indicators	Mean	Descriptive Rating
1. Completes computation tasks within the given time.	3.54	Often
2. Solves basic computation problems quickly.	3.48	Often
3. Selects the fastest method to solve computation problems.	3.44	Often
4. Performs mental computation efficiently.	3.42	Often
5. Finishes mathematics seatwork on time.	3.34	Sometimes
6. Solves computation exercises without unnecessary delays.	3.26	Sometimes
7. Uses time wisely when answering computation activities.	3.18	Sometimes
8. Performs computation with minimal hesitation.	3.11	Sometimes
9. Works efficiently during mathematics drills.	3.02	Sometimes
10. Maintains speed while ensuring correct answers.	2.94	Sometimes
Average Weighted Mean	**3.27**	**Sometimes**

Table 2.3
Extent of Computational Fluency of Grade 3 Learners in Terms of Flexibility in Using Computational Strategies (n=200)

Indicators	Mean	Descriptive Rating
1. Uses different strategies to solve computation problems.	3.46	Often
2. Chooses the most appropriate strategy for a computation task.	3.42	Often
3. Changes strategies when one method does not work.	3.34	Sometimes
4. Solves computation problems using mental mathematics.	3.30	Sometimes
5. Uses estimation before performing computations.	3.27	Sometimes
6. Applies number patterns to simplify computations.	3.21	Sometimes
7. Selects efficient methods for solving computation exercises.	3.18	Sometimes
8. Uses previously learned strategies in new computation tasks.	3.12	Sometimes
9. Explains why a particular computation strategy is effective.	3.08	Sometimes
10. Compares different computation strategies to obtain the best solution.	2.92	Sometimes
Average Weighted Mean	**3.23**	**Sometimes**

Table 2.4
Extent of Computational Fluency of Grade 3 Learners in Terms of Mastery of Basic Number Operations (n=200)

Indicators	Mean	Descriptive Rating
1. Demonstrates mastery of addition facts.	3.46	Often
2. Demonstrates mastery of subtraction facts.	3.32	Sometimes
3. Demonstrates mastery of multiplication facts.	3.18	Sometimes
4. Demonstrates mastery of division facts.	3.10	Sometimes
5. Recalls basic number facts without assistance.	2.96	Sometimes
6. Applies basic number operations accurately in classroom activities.	2.82	Sometimes
7. Performs number operations with confidence.	2.74	Sometimes
8. Uses basic number operations in solving routine mathematics exercises.	2.68	Sometimes
9. Solves computation exercises involving mixed operations independently.	2.44	Rarely
10. Demonstrates consistent mastery of all four basic operations in unfamiliar situations.	2.58	Rarely
Average Weighted Mean	**2.93**	**Sometimes**

Table 2.5
Extent of Computational Fluency of Grade 3 Learners in Terms of Application of Computational Skills (n=200)

Indicators	Mean	Descriptive Rating
1. Applies computation skills in solving real-life problems.	3.58	Often
2. Uses computation skills correctly in classroom activities.	3.46	Often
3. Solves practical mathematics problems involving computation.	3.42	Often
4. Applies computation skills in word problems.	3.36	Sometimes
5. Uses computational skills during group learning activities.	3.28	Sometimes
6. Applies basic computation skills in different mathematics lessons.	3.20	Sometimes
7. Uses computational skills confidently in everyday situations.	3.08	Sometimes
8. Transfers computational skills to unfamiliar mathematical situations.	2.88	Sometimes
9. Applies computational skills independently in challenging tasks.	2.54	Rarely
10. Uses computational skills effectively in multi-step real-life problems.	2.42	Rarely
Average Weighted Mean	**3.22**	**Sometimes**

Table 3
Level of Mathematics Achievement of Grade 3 Learners During School Year 2025-2026 (n=200)

Mathematics Achievement (Final Grade)	Frequency	Percentage	Descriptive Rating
90–100	42	21.00	Outstanding
85–89	76	38.00	Very Satisfactory
80–84	58	29.00	Satisfactory
75–79	20	10.00	Fairly Satisfactory
Below 75	4	2.00	Did Not Meet Expectations
Total	**200**	**100.00**	

Table 4
Multiple Linear Regression Analysis on the Predictive Influence of Mathematical Reasoning Skills and Computational Fluency on the Mathematics Achievement of Grade 3 Learners

Predictor Variables	Unstandardized Coefficient (B)	Standard Error	Standardized Coefficient (β)	t-value	p-value	Decision
Constant	61.842	2.314	—	26.72	< .001	—
Mathematical Reasoning Skills	2.184	0.512	0.361	4.27	< .001	Signifi-cant
Computational Fluency	3.127	0.486	0.492	6.44	< .001	Signifi-cant

Model Summary

R	R^2	Adjusted R^2	F	p-value	Decision
0.726	0.527	0.522	109.68	< .001	Significant

DISCUSSION

Table 1.1 illustrates the extent of mathematical reasoning skills of Grade 3 learners in terms of identifying mathematical patterns and relationships. The findings revealed an average weighted mean of 3.29, with a descriptive rating of Sometimes, indicating that learners demonstrate this aspect of mathematical reasoning to a moderate extent. This finding suggests that while learners are able to recognize and apply mathematical patterns in certain situations, these skills are not consistently demonstrated across various mathematical tasks. Developing the ability to identify patterns and relationships is fundamental because it enables learners to understand mathematical concepts, make predictions, and solve problems more effectively.

Among the indicators, "Applies number patterns to solve mathematics problems" obtained the highest mean (M = 3.56, Often), followed by "Explains why a mathematical pattern happens" (M = 3.48, Often) and "Recognizes repeated patterns when solving mathematics problems" (M = 3.45, Often). Conversely, "Recognizes relationships between numbers and operations" obtained the lowest mean (M = 3.08, Sometimes). Other indicators, including identifying number patterns correctly, determining the next number in a sequence, comparing numbers, identifying mathematical patterns in real-life situations, using patterns to predict answers, and recognizing similarities and differences among mathematical ideas, were all rated Sometimes. These findings indicate that although learners can recognize and apply patterns in familiar situations, they require additional learning opportunities and guided instruction to strengthen their understanding of mathematical relationships.

Table 1.2 shows the extent of mathematical reasoning skills of Grade 3 learners in terms of logical reasoning and justification. The results yielded an average weighted mean of 2.98, interpreted as Sometimes, indicating that learners only occasionally demonstrate logical reasoning and justification when solving mathematical problems. This finding implies that learners have not yet fully developed the ability to explain their mathematical thinking, justify their solutions, and evaluate different problem-solving strategies, which are essential components of mathematical reasoning.

The indicator "Justifies mathematical answers with confidence" obtained the highest mean (M = 3.85, Often), suggesting that learners demonstrate confidence when explaining correct answers in some situations. However, "Explains how the answer is obtained" recorded the lowest mean (M = 2.48, Rarely), followed by "Gives reasons why the answer is correct" (M = 2.56, Rarely) and "Chooses the best strategy to solve a mathematics problem" (M = 2.60, Rarely). The remaining indicators were rated Sometimes. These findings indicate that while learners may confidently present final answers, they still experience difficulty articulating the reasoning and justification behind their solutions, highlighting the need for instructional strategies that promote mathematical explanation and critical thinking.

Table 1.3 reveals the extent of mathematical reasoning skills of Grade 3 learners in terms of problem-solving and mathematical modeling. The findings produced an average weighted mean of 3.17, with a descriptive rating of Sometimes, indicating that learners occasionally apply mathematical reasoning when solving problems and representing real-life situations mathematically. This finding suggests that although learners possess basic problem-solving skills, they have not yet consistently demonstrated the ability to apply mathematical concepts in unfamiliar or complex situations.

Among the indicators, "Understands what a mathematics problem asks" obtained the highest mean (M = 3.52, Often), followed by "Chooses the correct operation to solve a problem" (M = 3.44, Often). In contrast, "Enjoys solving challenging mathematics problems" obtained the lowest mean (M = 2.29, Rarely), while "Uses previous knowledge to solve unfamiliar mathematics problems" also received a Rarely rating (M = 2.54). The remaining indicators were rated Sometimes. These findings indicate that learners perform

better in solving familiar mathematical problems but encounter greater difficulty when required to solve challenging or unfamiliar tasks, emphasizing the need to strengthen higher-order problem-solving and mathematical modeling skills.

Table 1.4 indicates the extent of mathematical reasoning skills of Grade 3 learners in terms of making mathematical connections. The data yielded an average weighted mean of 3.03, interpreted as Sometimes, indicating that learners occasionally relate mathematical concepts to one another and to real-life situations. This finding suggests that learners are beginning to establish meaningful connections among mathematical ideas; however, these connections are not yet consistently applied across different learning contexts. The ability to make mathematical connections enables learners to deepen conceptual understanding and apply mathematics beyond the classroom.

The highest-rated indicator was "Recognizes mathematics in real-life situations" (M = 3.52, Often), followed by "Explains how different mathematics concepts are related" (M = 3.46, Often) and "Uses mathematical connections to solve everyday problems" (M = 3.44, Often). Conversely, "Relates new mathematics lessons to previously learned concepts" obtained the lowest mean (M = 2.78, Sometimes). All other indicators received Sometimes ratings. These findings imply that learners are more capable of recognizing mathematics in practical situations than of connecting newly learned concepts with prior knowledge, indicating the need for instructional activities that promote conceptual integration across mathematics topics.

Table 1.5 reflects the extent of mathematical reasoning skills of Grade 3 learners in terms of communicating mathematical thinking. The results revealed an average weighted mean of 3.16, interpreted as Sometimes, indicating that learners only occasionally communicate their mathematical ideas, reasoning, and solutions effectively. This finding suggests that while learners possess some ability to express mathematical thinking, they may still lack the confidence and communication skills necessary to explain mathematical concepts clearly and accurately during classroom activities.

Among the indicators, "Communicates mathematical reasoning clearly and confidently" obtained the highest mean (M = 3.86, Often), followed by "Explains mathematical solutions using appropriate representations" (M = 3.42, Often). On the other hand, "Explains mathematical ideas clearly to classmates" obtained the lowest mean (M = 2.46, Rarely), while "Uses appropriate mathematical terms when communicating ideas" (M = 2.58, Rarely) and "Describes the steps used in solving mathematics problems" (M = 2.60, Rarely) also received Rarely ratings. The remaining indicators were rated Sometimes. These findings indicate that although learners are capable of communicating mathematical reasoning in certain situations, they continue to experience difficulty explaining their ideas and using appropriate mathematical language, highlighting the need for classroom activities that foster mathematical discourse and communication skills.

Table 2.1 illustrates the extent of computational fluency of Grade 3 learners in terms of accuracy in computation. The findings revealed an average weighted mean of 3.19, with

a descriptive rating of Sometimes, indicating that learners occasionally demonstrate accuracy when performing computational tasks. This finding suggests that although learners possess the basic skills needed to perform mathematical computations, they do not consistently produce accurate answers across different types of computation exercises. Accuracy in computation is a fundamental component of computational fluency, as it enables learners to solve mathematical problems correctly and confidently.

Among the indicators, "Solves addition problems correctly" obtained the highest mean (M = 3.58, Often), followed by "Solves subtraction problems correctly" (M = 3.46, Often) and "Solves multiplication problems accurately" (M = 3.42, Often). In contrast, "Obtains correct answers when solving computation exercises" recorded the lowest mean (M = 2.37, Rarely), while "Corrects computation errors after checking" also received a Rarely rating (M = 2.56). The remaining indicators were rated Sometimes. These findings indicate that learners demonstrate greater accuracy in basic arithmetic operations than in monitoring, correcting, and consistently producing accurate answers, highlighting the need to strengthen learners' computation checking and self-correction skills.

Table 2.2 shows the extent of computational fluency of Grade 3 learners in terms of efficiency in computation. The results yielded an average weighted mean of 3.27, interpreted as Sometimes, indicating that learners occasionally perform computation tasks efficiently. This finding implies that while learners are able to complete basic computational activities within an acceptable period, they have not yet consistently developed the speed and efficiency expected for computational fluency. Developing computational efficiency enables learners to solve mathematical tasks more quickly while maintaining accuracy.

The indicator "Completes computation tasks within the given time" obtained the highest mean (M = 3.54, Often), followed by "Solves basic computation problems quickly" (M = 3.48, Often), "Selects the fastest method to solve computation problems" (M = 3.44, Often), and "Performs mental computation efficiently" (M = 3.42, Often). Meanwhile, "Maintains speed while ensuring correct answers" obtained the lowest mean (M = 2.94, Sometimes). The remaining indicators were likewise rated Sometimes. These findings suggest that although learners demonstrate reasonable speed in completing familiar computation tasks, they still experience difficulty balancing speed with accuracy, emphasizing the need for continuous practice in efficient computation strategies.

Table 2.3 reveals the extent of computational fluency of Grade 3 learners in terms of flexibility in using computational strategies. The findings obtained an average weighted mean of 3.23, with a descriptive rating of Sometimes, indicating that learners occasionally apply different computational strategies when solving mathematical problems. This finding suggests that learners are beginning to demonstrate flexibility in selecting and using various solution methods; however, they do not consistently adjust or modify strategies according to the demands of different computation tasks.

Among the indicators, "Uses different strategies to solve computation problems" obtained the highest mean (M = 3.46, Often), followed by "Chooses the most appropriate strategy

for a computation task" (M = 3.42, Often). Conversely, "Compares different computation strategies to obtain the best solution" registered the lowest mean (M = 2.92, Sometimes). All other indicators, including changing strategies, using mental mathematics, estimation, number patterns, and previously learned strategies, received Sometimes ratings. These findings indicate that although learners can utilize different computational approaches, they require additional opportunities to evaluate, compare, and select the most effective strategies for solving various mathematical problems.

Table 2.4 indicates the extent of computational fluency of Grade 3 learners in terms of mastery of basic number operations. The data yielded an average weighted mean of 2.93, interpreted as Sometimes, indicating that learners occasionally demonstrate mastery of the four fundamental number operations. This finding implies that while learners have acquired basic computational knowledge, they have not yet consistently mastered addition, subtraction, multiplication, and division, particularly when solving more complex or unfamiliar mathematical tasks. Mastery of basic number operations is essential for developing higher-level mathematical competencies.

The highest-rated indicator was "Demonstrates mastery of addition facts" (M = 3.46, Often), while "Solves computation exercises involving mixed operations independently" obtained the lowest mean (M = 2.44, Rarely). Likewise, "Demonstrates consistent mastery of all four basic operations in unfamiliar situations" received a Rarely rating (M = 2.58). The remaining indicators were rated Sometimes. These findings suggest that learners are more proficient in basic addition than in applying multiple operations independently and transferring computation skills to unfamiliar mathematical situations, indicating the need for more varied and challenging computation activities.

Table 2.5 reflects the extent of computational fluency of Grade 3 learners in terms of the application of computational skills. The findings revealed an average weighted mean of 3.22, interpreted as Sometimes, indicating that learners occasionally apply computational skills in classroom and real-life situations. This finding suggests that learners possess basic computational abilities but have not yet consistently transferred these skills to more complex, practical, or unfamiliar mathematical tasks. Applying computational skills effectively is important because it enables learners to solve meaningful problems encountered both inside and outside the classroom.

Among the indicators, "Applies computation skills in solving real-life problems" obtained the highest mean (M = 3.58, Often), followed by "Uses computation skills correctly in classroom activities" (M = 3.46, Often) and "Solves practical mathematics problems involving computation" (M = 3.42, Often). On the other hand, "Uses computational skills effectively in multi-step real-life problems" obtained the lowest mean (M = 2.42, Rarely), while "Applies computational skills independently in challenging tasks" also received a Rarely rating (M = 2.54). The remaining indicators were rated Sometimes. These findings indicate that learners are generally capable of applying computational skills in familiar contexts but continue to experience difficulty when solving complex, multi-step, and challenging mathematical problems independently.

Table 3 illustrates the level of mathematics achievement of Grade 3 learners during School Year 2025–2026. The results show that the largest proportion of learners, 76 or 38.00%, obtained a Very Satisfactory rating (85–89). This was followed by 58 learners (29.00%) who achieved a Satisfactory rating (80–84), while 42 learners (21.00%) attained an Outstanding rating (90–100). These findings indicate that the majority of the learners performed at satisfactory to very satisfactory levels, suggesting that they have acquired the expected mathematical knowledge and skills appropriate for their grade level.

Meanwhile, 20 learners (10.00%) obtained a Fairly Satisfactory rating (75–79), and only 4 learners (2.00%) received a rating of Did Not Meet Expectations (below 75). The relatively small percentage of learners who did not meet the expected level of achievement indicates that most Grade 3 learners were able to attain the minimum learning competencies in mathematics. However, the presence of learners with fairly satisfactory and below satisfactory performance suggests the need for continuous instructional support, differentiated learning activities, and appropriate intervention programs to improve the mathematical achievement of struggling learners while sustaining the performance of those who achieved higher levels.

Table 4 presents the results of the multiple linear regression analysis conducted to determine the predictive influence of mathematical reasoning skills and computational fluency on the mathematics achievement of Grade 3 learners. The regression model was found to be statistically significant ($F = 109.68$, $p < .001$), indicating that the predictor variables collectively explain a significant portion of learners' mathematics achievement. The model yielded an R value of 0.726, indicating a strong positive relationship between the predictor variables and mathematics achievement. Furthermore, the coefficient of determination ($R^2 = 0.527$) indicates that 52.7% of the variance in mathematics achievement can be explained by mathematical reasoning skills and computational fluency, while the remaining 47.3% may be attributed to other factors not included in the model.

The findings further revealed that both predictor variables significantly influenced mathematics achievement. Computational fluency emerged as the stronger predictor ($\beta = 0.492$, $B = 3.127$, $t = 6.44$, $p < .001$), indicating that improvements in computational fluency are associated with greater increases in mathematics achievement. Similarly, mathematical reasoning skills also significantly predicted mathematics achievement ($\beta = 0.361$, $B = 2.184$, $t = 4.27$, $p < .001$), demonstrating that learners with stronger reasoning abilities tend to achieve higher mathematics performance. Since the p-values for both variables are less than the 0.05 level of significance, the null hypothesis is rejected. These findings suggest that enhancing both mathematical reasoning skills and computational fluency is essential for improving the mathematics achievement of Grade 3 learners, with computational fluency exerting a relatively greater influence on learners' academic performance.

Conclusions

Based on the findings of the study, the following conclusions were drawn:

1. Grade 3 learners possess a moderate level of mathematical reasoning skills, indicating that they have developed fundamental competencies in identifying mathematical patterns, logical reasoning, problem-solving, making mathematical connections, and communicating mathematical thinking. However, these skills have not yet reached a high level, suggesting the need for sustained instructional support and meaningful learning experiences to further develop higher-order mathematical thinking.

2. Grade 3 learners demonstrate some extent of computational fluency. Although they exhibit satisfactory performance in computational accuracy, efficiency, flexibility, mastery of basic number operations, and application of computational skills, they still require continuous practice and differentiated learning opportunities to enhance fluency, automaticity, and the effective application of computation in increasingly complex mathematical situations.

3. Grade 3 learners achieved a Very Satisfactory level of mathematics achievement, indicating that the majority attained the expected learning competencies prescribed in the Grade 3 Mathematics curriculum. Nevertheless, the presence of learners with fairly satisfactory and below-expected performance highlights the importance of providing appropriate interventions to ensure that all learners achieve proficiency.

4. Mathematical reasoning skills and computational fluency are significant predictors of mathematics achievement among Grade 3 learners. The findings confirm that improvements in these competencies are associated with higher levels of mathematics achievement. Furthermore, computational fluency exerts a stronger predictive influence than mathematical reasoning skills, emphasizing the importance of strengthening learners' computational competence while simultaneously developing their reasoning abilities.

5. The proposed Project MATH-UP (Mathematics Achievement Through Higher-Order Understanding and Proficiency) is an appropriate enhancement program to address the identified learning needs of Grade 3 learners. Through targeted instructional interventions that strengthen mathematical reasoning, computational fluency, and authentic problem-solving skills, the program has the potential to improve learners' mathematics achievement and promote meaningful and sustained learning outcomes.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are offered:

1. Since the Grade 3 learners demonstrated a moderate level of mathematical reasoning skills, mathematics teachers may strengthen classroom instruction by incorporating activities that promote higher-order thinking, logical reasoning, mathematical communication, and problem-solving. The use of inquiry-based learning, mathematical discourse, open-ended tasks, and contextualized problem-solving activities may further enhance learners' reasoning abilities.

2. Considering that the learners exhibited a moderate level of computational fluency, teachers are encouraged to implement regular numeracy activities, mental computation exercises, number talks, differentiated instruction, and mastery-based learning strategies. These instructional practices may improve learners' computational accuracy, efficiency, flexibility, and application of computational skills in various mathematical contexts.

3. Although the learners attained a very satisfactory level of mathematics achievement, school administrators and teachers should continue implementing learner-centered instructional approaches, periodic formative assessments, and timely intervention programs to sustain and further improve learners' academic performance. Special attention should be given to learners who obtained fairly satisfactory and below-expected performance through remediation, enrichment, and individualized learning support.

4. Since mathematical reasoning skills and computational fluency significantly predict mathematics achievement, mathematics teachers should deliberately integrate instructional strategies that simultaneously develop conceptual understanding and procedural fluency. School heads and instructional supervisors may also provide professional development programs focusing on evidence-based mathematics instruction, problem-based learning, differentiated teaching, and effective assessment practices to improve learner outcomes.

5. The proposed Project MATH-UP (Mathematics Achievement Through Higher-Order Understanding and Proficiency) may be adopted and implemented by schools as an intervention program to strengthen learners' mathematical reasoning skills, computational fluency, and mathematics achievement. School administrators should ensure adequate instructional resources, monitoring mechanisms, and stakeholder support to maximize the program's effectiveness. Furthermore, future researchers may conduct similar studies using additional predictor variables, larger populations, different grade levels, or other educational settings to validate and extend the findings of the present study.

Compliance with Ethical Standards

The researcher conducted the study in accordance with established ethical principles governing educational research involving human participants and in compliance with institutional research protocols, the Department of Education (DepEd) ethical standards, and Republic Act No. 10173, otherwise known as the Data Privacy Act of 2012. Prior to the conduct of the study, approval was secured from the Dean of the Graduate School, the Schools Division Superintendent of the Schools Division Office of Nueva Ecija, and the school heads of the participating public elementary schools. Since the respondents were Grade 3 learners who were minors, written parental or guardian consent and learner assent were obtained before data collection. Participation was entirely voluntary, and the participants were informed of the purpose, procedures, benefits, and their right to decline participation or withdraw from the study at any time without penalty.

The confidentiality and anonymity of the respondents were strictly maintained by using learner codes instead of names. The learners' Mathematics final grades were accessed

only with the approval of the authorized school officials. All research data were securely stored, accessible only to the researcher, and used solely for academic and research purposes in accordance with the Data Privacy Act of 2012. The findings were reported only in aggregate form to protect the identities of the participants and schools. The researcher ensured that the study posed no physical, psychological, emotional, social, or academic harm to the respondents and that data collection did not disrupt regular classroom instruction. The ethical principles of beneficence, non-maleficence, justice, and respect for persons were observed throughout the study. The researcher likewise maintained honesty, integrity, and objectivity in the collection, analysis, interpretation, and reporting of data, with all sources properly acknowledged in accordance with the APA 7th Edition citation and referencing guidelines. The findings of the study were used solely as the basis for the proposed Mathematics Enhancement Program to improve the mathematical reasoning skills, computational fluency, and mathematics achievement of Grade 3 learners.

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