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A Quantitative Non-Experimental Descriptive Research Study on the Least Learned Competencies in the Rapid Mathematics Assessment (RMA) Among Grade 5 Learners of Sanyata Elementary School, Bislig City Division: Basis for Developing an Enhanced School-Based Mathematics Intervention Program

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ABSTRACT

This study determined the least learned competencies in the Rapid Mathematics Assessment (RMA) among Grade 5 learners of Sanyata Elementary School, Bislig City Division, as basis for developing an enhanced school-based Mathematics Intervention Program. It used a quantitative non-experimental descriptive design and records-based analysis of official beginning-of-school-year (BOSY) and end-of-school-year (EOSY) RMA results. Complete enumeration was applied to the available Grade 5 class records: 20 learners had BOSY records and 23 learners had EOSY records. The official Grade 5 RMA and a researcher-made Competency Analysis Matrix were used to organize scores by learning area and competency. Data were analyzed using frequency count, percentage, mean percentage score (MPS), and ranking. Overall performance increased from 32.97% MPS at BOSY to 69.97% at EOSY. Number and Algebra reached 75.36% MPS, Data and Probability reached 71.74%, and Measurement and Geometry remained the weakest domain at 64.35%. Sixteen competencies remained below the 75% mastery criterion. The lowest-performing competency was measuring and drawing angles using a protractor (30.43%), followed by converting units of measure (34.78%) and adding dissimilar fractions or mixed numbers (34.78%). The findings show that RMA records can provide a practical basis for a targeted, school-based intervention emphasizing hands-on geometry activities, guided practice in number operations and fractions, graph interpretation, diagnostic grouping, and regular progress monitoring.

Keywords: *Rapid Mathematics Assessment, least learned competencies, Grade 5 learners, mathematics intervention program, measurement and geometry, numeracy assessment*

INTRODUCTION

Mathematics develops numeracy, logical reasoning, problem-solving, and decision-making skills that are important in school and in daily life. However, mathematics learning remains a major concern across education systems. The Organisation for Economic Co-operation and Development (2023) reported that Filipino learners obtained an average mathematics score of 355 in PISA 2022, which was substantially below the OECD average

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of 472. Only 16% of Filipino learners reached at least Level 2 proficiency. Although PISA assesses 15-year-old learners, persistent difficulties at that stage point to the need to identify and address learning gaps earlier in the elementary grades.

Foundational learning challenges are also evident in the primary years. The World Bank and UNESCO Institute for Statistics (2024) reported severe learning poverty in the Philippines, while the SEA-PLM regional report showed that mathematics proficiency among Grade 5 learners in Southeast Asia remained uneven despite improvements from the previous cycle (UNICEF & Southeast Asian Ministers of Education Organization [SEAMEO], 2024). These reports support the need for school-level diagnostic assessment because broad national and regional patterns must be translated into specific instructional responses for actual learners.

The Department of Education has emphasized the use of assessment evidence to support learning recovery and instructional planning. The MATATAG Curriculum recognizes mathematics as a priority area for foundational learning (Department of Education, 2024). The Rapid Mathematics Assessment (RMA) is particularly useful because it organizes learner performance across three domains: Number and Algebra, Measurement and Geometry, and Data and Probability. When analyzed at competency level, RMA results help teachers determine which skills require reteaching, reinforcement, or enrichment.

Grade 5 is a critical stage because learners are expected to move from basic numeracy toward more complex applications involving operations, fractions, measurement, geometry, and interpretation of data. Unaddressed gaps at this level can affect readiness for higher mathematics. In Sanyata Elementary School, Bislig City Division, a school-based analysis of RMA records was therefore necessary to identify the competencies that learners found most difficult and to use the evidence as basis for an enhanced mathematics intervention program.

This study determined the overall and domain-specific RMA performance of Grade 5 learners, identified and ranked competencies that remained below the 75% mastery criterion, and developed an enhanced school-based Mathematics Intervention Program based on the identified needs. The study contributes a practical assessment-to-intervention approach that can guide teachers, mathematics coordinators, and school heads in planning focused learning support.

Literature Review

Rapid Mathematics Assessment and Competency-Based Diagnosis

The RMA provides a concise school-based view of learners' performance in the major mathematics domains of Number and Algebra, Measurement and Geometry, and Data and Probability. These domains align with the organization of mathematics learning in the basic education curriculum. Competency-based analysis is important because an overall score may hide specific weaknesses. A class may appear near mastery in one domain while still showing serious difficulty in particular skills, such as fraction operations, unit conversion, or angle measurement.

Mathematical proficiency is multidimensional. The National Research Council (2001) described five interconnected strands: conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition. This perspective is relevant to RMA interpretation because incorrect responses may reflect more than computational error. Learners may need support in understanding concepts, selecting procedures, applying strategies, and using mathematical tools with confidence.

Assessment-based intervention is consistent with mastery learning. Bloom (1968) explained that learners benefit from corrective instruction and additional time when formative evidence shows that expected learning has not yet been achieved. In a school-based setting, the RMA can serve this corrective purpose by identifying competencies that should be prioritized during remediation.

Number and Algebra

Number and Algebra include number relationships, operations, fractions, decimals, patterns, number sentences, and early algebraic reasoning. It provides a foundation for other areas of mathematics because measurement, geometry, probability, and data analysis all require flexible understanding of numbers and

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operations (National Research Council, 2001). At the Grade 5 level, difficulties in subtraction, multiplication, division, fractions, and mixed numbers can affect performance in both routine exercises and applied problem solving.

Instruction in this domain should not be limited to memorized procedures. Learners need to connect symbols with visual representations and real situations. Bruner's (1966) view of representation supports the use of concrete, pictorial, and symbolic experiences. Fraction strips, number lines, guided computation, and step-by-step problem solving can therefore be useful when RMA results show weaknesses in number operations and fraction concepts.

Measurement and Geometry

Measurement and Geometry involve quantities, units, shapes, figures, spatial relationships, angles, perimeter, area, and the appropriate use of mathematical tools. This domain requires learners to coordinate conceptual understanding with accurate procedures. A learner measuring an angle, for example, must understand the idea of angle measure, position a protractor correctly, read the appropriate scale, and draw or classify the resulting angle.

Crompton and Ferguson (2024) emphasized the importance of shape attributes, spatial orientation, composition and decomposition of figures, and transformations in elementary geometry. Idrus et al. (2022) likewise concluded that area measurement is strengthened when learners understand principles rather than rely only on formulas. These studies support hands-on and visual approaches, including rulers, protractors, cut-outs, grid paper, and contextualized measurement tasks. Such approaches are especially relevant when diagnostic assessment identifies persistent difficulty in geometry and measurement.

Data and Probability

Data and Probability include organizing, presenting, interpreting, and analyzing information in tables and graphs as well as developing basic understanding of uncertainty. Data literacy should begin in the elementary grades because learners increasingly encounter information presented in visual and numerical forms. The GAISE II report emphasized the importance of building data literacy across grade levels through meaningful questions, real data, and communication of findings (Bargagliotti et al., 2020).

Recent reviews show that data literacy instruction benefits from authentic problems and contextualized learning experiences (Friedrich et al., 2024; Witte et al., 2025). DePascale and Ramani (2024) also showed that structured mathematics games can support children's mathematical and statistical understanding. For Grade 5 intervention, classroom-generated surveys, table-reading tasks, and interpretation of simple line graphs can provide practical reinforcement.

School-Based Intervention and Progress Monitoring

Targeted intervention should respond to the specific skills revealed by assessment. Vygotsky (1978) emphasized the value of guided support within learners' developing capabilities. Small-group instruction, teacher modelling, peer-assisted learning, and gradual release of responsibility can help learners move from assisted performance toward independent mastery.

An effective school-based program also requires regular monitoring. Short quizzes, practice exercises, performance tasks, and competency checklists allow teachers to determine whether learners need reteaching, regrouping, or enrichment. In this way, the RMA is not treated as a final judgment but as the starting point for a continuing cycle of diagnosis, instruction, assessment, and adjustment.

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METHODS

Research Design

The study used a quantitative non-experimental descriptive research design. It described the existing mathematics performance of Grade 5 learners without manipulating variables or introducing an experimental treatment. A records-based analysis was conducted using official RMA answer sheets, score summaries, and competency-level class records. The BOSY results were treated as baseline evidence, while EOSY results served as the latest assessment evidence and the primary basis for identifying the least learned competencies.

Research Locale

The study was conducted at Sanyata Elementary School in Sitio Sanyata, Barangay San Roque, Bislig City, Surigao del Sur. The school is under the Bislig City Division in Region XIII (Caraga). The locale was selected because the available school records allowed a focused analysis of Grade 5 mathematics needs within an actual public elementary school context.

Participants and Sampling Technique

Complete enumeration was used for the available Grade 5 class records. The EOSY dataset included 23 learners, representing the available class records used for the competency-level analysis. The BOSY baseline dataset included 20 learner records. Because the study analyzed existing records, the number of records differed between assessment periods. The EOSY results were used to rank the least learned competencies and guide the intervention plan.

Research Instrument

Two instruments were used: the official Grade 5 Rapid Mathematics Assessment and a researcher-made RMA Competency Analysis Matrix. The official RMA measured performance in Number and Algebra, Measurement and Geometry, and Data and Probability. The matrix classified each RMA item according to domain and competency, recorded the number of correct responses and possible responses, computed percentage scores, and ranked competencies from lowest to highest performance. The matrix provided a systematic basis for identifying competencies below the 75% mastery criterion.

Data Gathering Procedure

After permission to access the school records had been secured, the researcher retrieved the available BOSY and EOSY RMA records. Learner names were replaced with codes. Scores were encoded in the Competency Analysis Matrix, grouped by learning area and competency, checked for completeness, and summarized. The EOSY item-level results were then examined to identify competencies requiring intervention.

Data Analysis

Frequency count and percentage were used to describe the distribution of learners across performance levels. Mean Percentage Score (MPS) was computed to summarize overall performance and performance per learning area. Percentage score per competency was computed by dividing the points earned by the maximum possible points and multiplying the result by 100. Competencies with EOSY scores below 75% were classified as least learned and ranked from the lowest to the highest percentage score.

Ethical Consideration

The study used school assessment records solely for academic and instructional planning purposes. Confidentiality and anonymity were maintained by using learner codes instead of names. Records were handled securely, and findings were presented in aggregate form. The intervention plan was designed to support learning rather than label or stigmatize individual learners.

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RESULTS AND DISCUSSION

Overall RMA Performance

Table 1. *Overall Performance Level of Grade 5 Learners in the RMA*

Assessment Period	No. of Learners	Highest Score	Lowest Score	Mean Score	Total Score	MPS	Performance Level
BOSY	20	16	6	10.55/32	211/640	32.97%	Emerging / Low Proficient
EOSY	23	30	10	22.39/32	515/736	69.97%	Transitioning / Proficient

Table 1 shows that overall performance improved from 32.97% MPS during BOSY to 69.97% during EOSY, an increase of 37.00 percentage points. The class moved from Emerging / Low Proficient to Transitioning / Proficient. The increase indicates meaningful learning progress during the school year. However, the EOSY MPS remained below the 75% mastery criterion, which confirms the need for continued intervention in competencies where learners had not yet achieved mastery.

Table 2. *Distribution of Learners by RMA Performance Level*

Performance Level	BOSY f	BOSY %	EOSY f	EOSY %
At Grade Level / Highly Proficient	0	0.00%	8	34.78%
Transitioning / Proficient	0	0.00%	8	34.78%
Developing / Nearly Proficient	4	20.00%	5	21.74%
Emerging / Low Proficient	15	75.00%	2	8.70%
Emerging / Not Proficient	1	5.00%	0	0.00%
Total	20	100.00%	23	100.00%

The performance distribution also improved. During BOSY, 16 of the 20 learners, or 80.00%, were in the two Emerging categories. During EOSY, 16 of the 23 learners, or 69.56%, were already classified as either Transitioning / Proficient or At Grade Level / Highly Proficient. Only two learners remained in Emerging / Low Proficient, and none remained in Emerging / Not Proficient. These results show that improvement occurred across the class, although a smaller group still required focused remediation.

Performance by Learning Area

Table 3. *Performance Level of Grade 5 Learners by Learning Area*

Learning Area	Assessment Period	Mean Score	Maximum Score	MPS	Learners With at Least 75% Mastery	Performance Description
Number and Algebra	BOSY	5.50	15	36.67%	0/20 (0.00%)	Low Mastery
Number and Algebra	EOSY	11.30	15	75.36%	12/23 (52.17%)	Mastered / Near Grade Level
Measurement and Geometry	BOSY	3.95	15	26.33%	0/20 (0.00%)	Very Low Mastery
Measurement and Geometry	EOSY	9.65	15	64.35%	8/23 (34.78%)	Developing Mastery

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Data and Probability	BOSY	1.10	2	55.00%	6/20 (30.00%)	Developing Mastery
Data and Probability	EOSY	1.43	2	71.74%	11/23 (47.83%)	Near Mastery

Table 4. *Improvement in RMA Performance by Learning Area*

Learning Area	BOSY MPS	EOSY MPS	Increase in MPS
Number and Algebra	36.67%	75.36%	+38.70 percentage points
Measurement and Geometry	26.33%	64.35%	+38.01 percentage points
Data and Probability	55.00%	71.74%	+16.74 percentage points

Tables 3 and 4 show improvement in all three learning areas. Number and Algebra obtained the highest EOSY MPS at 75.36% and recorded the largest increase. Data and Probability reached 71.74%, which was close to mastery. Measurement and Geometry increased substantially but remained the weakest area at 64.35%. The result confirms that class-wide improvement does not remove the need for domain-specific intervention. The weakest area requires greater instructional attention because learners must coordinate concepts, procedures, and correct use of tools when performing geometry and measurement tasks.

The findings are consistent with literature emphasizing conceptual and visual learning in elementary geometry. Crompton and Ferguson (2024) highlighted spatial reasoning and shape relationships, while Idrus et al. (2022) stressed the importance of conceptual knowledge in measurement. For the present learners, practical activities using protractors, rulers, cut-outs, and real objects are appropriate because these resources connect abstract ideas with observable actions.

Ranked Least Learned Competencies

Table 5. *Ranked Least Learned Competencies Based on EOSY RMA Results*

Rank	Learning Area	Competency / Skill Assessed	Percentage Score
1	Measurement and Geometry	Measures and draws angles using a protractor	30.43%
2	Measurement and Geometry	Converts units involving length, mass, capacity, time, or elapsed time	34.78%
3	Number and Algebra	Adds dissimilar fractions or mixed numbers	34.78%
4	Number and Algebra	Subtracts numbers less than 10,000 with or without regrouping	47.83%
5	Measurement and Geometry	Identifies properties and classifications of triangles and quadrilaterals	52.17%
6	Measurement and Geometry	Solves perimeter of composite figures involving triangles and quadrilaterals	56.52%
7	Data and Probability	Interprets data presented in tables or single-line graphs	56.52%
8	Number and Algebra	Multiplies numbers with or without regrouping and applies multiplication properties	60.87%
9	Number and Algebra	Adds dissimilar fractions	63.04%

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10	Measurement and Geometry	Illustrates right, acute, and obtuse angles	65.22%
11	Number and Algebra	Divides three- to four-digit numbers by one-digit numbers	65.22%
12	Measurement and Geometry	Finds the perimeter of quadrilaterals that are not squares or rectangles	65.22%
13	Number and Algebra	Subtracts similar fractions using models	69.57%
14	Measurement and Geometry	Converts units of measure, including capacity and elapsed time	69.57%
15	Measurement and Geometry	Converts units involving time or elapsed time	69.57%
16	Number and Algebra	Adds numbers less than 1,000,000 with or without regrouping	73.91%

Table 5 identifies 16 competencies below the 75% mastery criterion. The most difficult skill was measuring and drawing angles using a protractor, with only 30.43% performance. This finding suggests that many learners experienced difficulty in positioning the tool correctly, reading the appropriate scale, and applying the steps involved in angle measurement. Unit conversion and the addition of dissimilar fractions or mixed numbers followed at 34.78%. Both skills require conceptual understanding and procedural accuracy, which supports the use of visual models, guided practice, and repeated contextualized activities.

The list also shows that weaknesses occurred within domains that had relatively stronger overall results. Although Number and Algebra reached 75.36% MPS at domain level, several competencies involving fractions and operations remained below mastery. This illustrates the value of competency-level diagnosis: a broad domain score alone would not reveal the exact skills that require reinforcement.

Table 6. *Summary of Least Learned Competencies by Learning Area*

Learning Area	No. of Least Learned Items	General Skills Needing Intervention
Number and Algebra	7	Fractions, mixed numbers, subtraction, multiplication, division, and multi-step computation
Measurement and Geometry	8	Angles, protractor use, unit conversion, perimeter, triangles, quadrilaterals, and composite figures
Data and Probability	1	Reading and interpreting tables and line graphs
Total	16	Targeted remediation across the three domains

Measurement and Geometry accounted for eight of the 16 least learned items, Number and Algebra accounted for seven, and Data and Probability accounted for one. This distribution provides a clear priority order for intervention. Geometry and measurement activities should receive the greatest instructional time, while number operations and fractions should be reinforced systematically. Graph interpretation should remain part of the program because it is important for mathematical and data literacy (Bargagliotti et al., 2020; Witte et al., 2025).

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Proposed Enhanced School-Based Mathematics Intervention Program

Table 7. *Proposed Enhanced School-Based Mathematics Intervention Program*

Program Component	Target Competencies	Suggested Activities / Strategies	Schedule and Success Indicator
Learner profiling and diagnostic grouping	All least learned competencies	Group learners according to competency needs; prepare simple learner profiles using RMA item results.	Start of intervention; learners grouped according to specific needs.
Measurement and Geometry remediation	Angles, protractor use, unit conversion, perimeter, triangles, quadrilaterals, and composite figures	Use protractors, rulers, cut-outs, geoboards, grid paper, and real-life measurement tasks; provide teacher modelling and peer-assisted practice.	Twice weekly; at least 75% of learners reach mastery in target skills.
Number and Algebra reinforcement	Fractions, mixed numbers, subtraction, multiplication, and division	Use concrete-pictorial-symbolic activities, fraction strips, number lines, drill cards, mathematics games, and guided problem solving.	Twice weekly; improved accuracy and mastery in target operations.
Data and Probability reinforcement	Interpreting tables and line graphs	Use class-generated data, simple surveys, table reading, graph interpretation, and question-answer drills.	Once weekly; learners correctly interpret information from tables and graphs.
Home-based reinforcement	Priority competencies requiring repeated practice	Provide short and manageable practice sheets; encourage parent or guardian support and feedback.	Weekly; improved completion and follow-through.
Progress monitoring and regrouping	All target competencies	Administer short formative checks; update monitoring records; reteach, regroup, or enrich learners according to current performance.	Weekly or biweekly; documented movement toward the 75% mastery criterion.

The proposed program is data-driven because it directly responds to the EOSY RMA results. It prioritizes Measurement and Geometry, reinforces selected Number and Algebra competencies, and includes Data and Probability support. The use of small-group instruction and peer-assisted learning is appropriate because learners differ in the specific competencies they need to strengthen. Concrete and visual materials are recommended because learners need opportunities to connect mathematical ideas with actions and representations (Bruner, 1966).

Progress monitoring is essential. Weekly or biweekly formative checks should be used to determine whether learners have reached mastery, need additional reteaching, or are ready for enrichment. This approach reflects mastery learning because assessment results are used to guide corrective instruction rather than merely record performance (Bloom, 1968).

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CONCLUSION

The Grade 5 learners demonstrated substantial improvement in the RMA from BOSY to EOSY. The overall MPS increased from 32.97% to 69.97%, and the class moved from Emerging / Low Proficient to Transitioning / Proficient. Nevertheless, the EOSY result remained below the 75% mastery criterion, showing that learning gaps continued to require focused instructional support.

Number and Algebra was the strongest domain at EOSY, but some competencies involving fractions and basic operations remained below mastery. Measurement and Geometry was the weakest domain and contained the greatest number of least learned competencies. Measuring and drawing angles using a protractor was the lowest-performing competency, followed by unit conversion and adding dissimilar fractions or mixed numbers. Data and Probability required reinforcement in the interpretation of tables and line graphs.

The findings confirm that RMA results can serve as a practical basis for designing a responsive school-based Mathematics Intervention Program. A targeted program should prioritize the identified skills, use concrete and visual learning experiences, provide guided and peer-assisted practice, and include regular progress monitoring.

Recommendations

Mathematics teachers should implement the proposed intervention program regularly, with primary emphasis on angle measurement, protractor use, unit conversion, geometric figures, and perimeter. Reinforcement should also be provided for fractions, mixed numbers, subtraction, multiplication, division, and graph interpretation. Lessons should use manipulatives, mathematical tools, visual aids, contextualized tasks, and step-by-step modelling.

The school head and mathematics coordinator should support the program through provision of materials, collaborative lesson planning, technical assistance, and a simple competency-monitoring system. Regular conferences may be conducted to review learner progress and determine whether activities need to be adjusted.

Parents and guardians should be encouraged to support manageable home-based practice and monitor attendance in intervention sessions. Future researchers may evaluate the effectiveness of the proposed program after implementation, apply a similar assessment-to-intervention approach in other grade levels, or investigate the causes of persistent difficulties in Measurement and Geometry.

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