Numeracy Assessment of Grade 7 Students in Salcedo Public Schools: Baseline Data for Extension Program Development

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Abstract

The Philippines faces a severe mathematics learning crisis, with national assessments revealing that most students lack basic numeracy competencies. While national data document this crisis, localized diagnostic assessment is essential for designing contextually appropriate interventions. This study assessed Grade 7 numeracy competencies in Salcedo Public Schools to establish the empirical foundation for targeted extension programming by Eastern Samar State University Salcedo Campus. The research employed a quantitative descriptive-comparative design analyzing secondary data from 364 Grade 7 students across all four public secondary schools in Salcedo, Eastern Samar, during the first quarter of School Year 2024-2025. Student proficiency in four fundamental operations—addition, subtraction, multiplication, and division—was measured using a 4-point scale with proficiency level descriptors: Below Basic, Beginning, Developing, and Proficient. Findings revealed hierarchical decline in proficiency as operational complexity increased: addition (58.79%), subtraction (30.77%), multiplication (28.85%), and division (22.25%). Approximately 69–78% of students performed below proficient level in subtraction, multiplication, and division, with substantial proportions at Below Basic and Beginning levels. Proficiency rates varied substantially across schools (8.33% to 89.74%), demonstrating need for differentiated intervention approaches. Most Grade 7 students demonstrated severe numeracy deficits requiring immediate intervention. The systematic erosion of proficiency across operations provided evidence of cascading failure wherein inadequate mastery of prerequisite skills prevents learning of dependent competencies. Recommendations include implementing multi-tiered intervention frameworks, developing school-specific protocols, prioritizing multiplication and division instruction, and establishing systematic progress monitoring.

Keywords: Numeracy assessment; baseline data; fundamental operations; intervention program; mathematics education

1. Introduction

Philippine education confronts a learning crisis of alarming proportions. The Second Congressional Commission on Education warned in 2025 that with the country's demographic window closing by 2045, the next two decades are critical. The Commission's assessment was stark: addressing learning gaps is not merely a social concern but an economic imperative for national survival (Second Congressional Commission on Education, 2025).

The numbers tell a troubling story. Learning poverty in the Philippines—measured as the percentage of 10-year-olds unable to read and understand a simple text—stands at 90.9%, among the highest in Asia (Second Congressional Commission on Education, 2024). More concerning, approximately 18 million Filipinos have graduated from basic education without achieving functional literacy and numeracy (Philippine Statistics Authority, 2024). These are not abstract statistics. They represent graduates entering adulthood unable to perform the computational and literacy tasks required for everyday life and work.

International assessments confirm what educators across the Philippines already observe. In PISA 2022, Filipino students scored 355 in mathematics, ranking 76th among 81 participating countries. The scores in reading (347, ranked 79th) and science (356, ranked 80th) were similarly low, all falling substantially below Organisation for Economic Co-operation and Development averages (OECD, 2023). Perhaps most revealing: only 23% of test-takers reached minimum proficiency across all three subjects. This means approximately three out of four 15-year-old Filipino students cannot demonstrate the basic academic competencies needed for further learning or real-world problem-solving.

Mathematics performance presents challenges. In PISA 2022, more than 80% of both male and female students performed as low achievers in mathematics, unable to execute basic mathematical reasoning tasks (OECD, 2023). These deficits extend beyond academic concerns—they directly constrain workforce development, economic productivity, and the country's progress toward Sustainable Development Goal 4, which aims to ensure equitable quality education by 2030 (United Nations, 2015).

However, national statistics, regardless of their severity, cannot answer the practical questions facing educators attempting to address these deficits: Which specific competencies are students lacking? Where should intervention efforts focus? How severe are the gaps within communities? Research on effective mathematics interventions consistently emphasizes that middle school represents a pivotal point where targeted support can prevent learning deficits from becoming permanent (Powell et al., 2021). The transition to Grade 7 is particularly critical. Students at this level must adapt to more abstract mathematical concepts and accelerate pacing while still building foundational skills. Attard (2013) identified three factors shaping student experiences during this transition: student self-regulation (metacognitive skills and motivation), school factors (curriculum and instructional quality), and social factors (peer and family support). Early identification of competency gaps at this juncture enables intervention before students disengage from mathematics entirely.

There is reason for optimism regarding intervention effectiveness. Powell et al.'s (2021) systematic review of 72 intervention studies found that 82% demonstrated positive effects on student outcomes. The most effective approaches shared common elements: explicit instruction with clear modeling, use of multiple representations to build understanding, strategic problem-solving instruction, and focused attention to mathematical language development. The evidence suggests that intervening during the middle school years, when students are still engaged with formal mathematics instruction, offers perhaps the best opportunity to address persistent deficits (Institute of Education Sciences, 2009).

Nevertheless, translating national awareness into local action requires something most schools and universities lack—detailed diagnostic data about their specific student populations. Schools vary considerably in resources, teacher capacity, and community contexts. National averages and regional statistics, while useful for understanding scope, provide insufficient guidance for intervention design. Effective programming demands specific information about actual competency levels, error patterns, and learning needs within the target population.

This presents both opportunity and responsibility for Eastern Samar State University (ESSU) Salcedo Campus. Republic Act No. 9311 (2004) mandates ESSU to provide not only instruction but also research and extension services to its community mandate that extends to all its campuses. The Salcedo Campus' location in the municipality positions is to address educational needs in its immediate service area. However, fulfilling this extension mandate requires more than institutional commitment—it demands systematic assessment of actual needs followed by evidence-based program development.

The confluence of national crisis, research evidence on effective interventions, and institutional mandate creates clear direction for action. As the Second Congressional Commission on Education concluded: “It is only by fixing the foundations of our system that we can build one that fulfills the promise of our people” (2025, p. 15). Foundation repair, however, requires knowing precisely which foundations need attention. This study addresses that need by providing comprehensive diagnostic information about Grade 7 numeracy competencies in Salcedo Public Schools. It establishes the empirical foundation necessary for ESSU-Salcedo to design targeted, evidence-based extension programming.

Therefore, this study sought to analyze Grade 7 numeracy performance across Salcedo public schools as a foundation for developing evidence-based extension interventions by Eastern Samar State University Salcedo Campus. Specifically, the study aimed: (1) to determine the proficiency levels of Grade 7 students in the four fundamental mathematical operations—addition, subtraction, multiplication, and division—across all public secondary schools in Salcedo municipality; (2) to determine operation-specific competency gaps requiring prioritized intervention; and (3) to establish baseline numeracy data informing the design and implementation of targeted tutoring programs by the BSEd Mathematics Department of Eastern Samar State University Salcedo Campus.

2. Methodology

2.1 Research Design

This study employed a quantitative descriptive-comparative design to assess Grade 7 numeracy competencies and establish baseline data for intervention development. The approach combines systematic characterization of proficiency distributions with structured comparison across operational domains—documenting current competency levels while identifying specific gaps requiring programmatic attention (Creswell & Creswell, 2018).

The descriptive component characterized the proficiency distribution of 364 Grade 7 students across four fundamental operations: addition, subtraction, multiplication, and division. This analysis established the overall numeracy landscape and quantified the magnitude of competency deficits. The comparative component examined performance differences across operations, determining relative difficulty and identifying which skills present the greatest challenges. This dual focus provides both current proficiency levels and specific gaps requiring attention—the essential information necessary for intervention planning (Rossi et al., 2019).

2.2 Research Locale

The study was conducted in Salcedo, a coastal municipality in Eastern Samar province, Eastern Visayas. Salcedo's economy relies primarily on fishing, copra production, and subsistence agriculture—a profile typical of many rural Eastern Visayas communities. The municipality operates four public secondary schools serving Grades 7-12 under the Department of Education's K-12 program.

Salcedo was selected for three practical reasons. First, Eastern Samar State University maintains a campus in the municipality, enabling sustained data access and ongoing intervention implementation. Second, the four-school system is manageable in size, allowing comprehensive assessment of the complete Grade 7 population rather than sampling. Third, the municipality's demographic and economic characteristics typify many rural Eastern Samar communities, potentially enhancing the transferability of findings and intervention strategies to similar contexts. To protect institutional privacy, schools are identified using pseudonyms (Schools A, B, C, D) throughout the analysis, and specific enrollment figures are reported as ranges rather than exact values.

2.3 Respondents and Data Sources

The study analyzed data from 364 Grade 7 students across all four public secondary schools in Salcedo who completed the numeracy assessment during the first quarter of School Year 2024-2025. This represents 100% of the Grade 7 enrolled population in these schools—a complete enumeration rather than a sample. Complete enumeration was both practical and preferable for this study: the population size was manageable, comprehensive data provides more accurate baseline information than sampling, and including all schools ensures equitable program access (Fowler, 2014).

Data was obtained as secondary data through the Students' Numeracy Profile (Form 1), the official recording instrument used by the Schools Division of Eastern Samar. These forms document individual student scores (0-3 scale) for each of the four fundamental operations. The researchers received de-identified forms—school personnel replaced student names with numerical codes prior to data release, maintaining confidentiality consistent with DepEd privacy protocols.

2.4 Research Instrument

This study utilized secondary data from the Students' Numeracy Profile (Form 1), administered by the Department of Education, Schools Division of Eastern Samar, to Grade 7 students during the first quarter of School Year 2024-2025. The assessment measures student proficiency in four fundamental mathematical operations: addition, subtraction, multiplication, and division. Student performance on each operation is scored using a 4-point scale ranging from 0 to 3.

The numerical scores were interpreted using proficiency level descriptors aligned with the Department of Education's standards-based assessment framework established in DepEd Order No. 31, s. 2012. Following established practice in Philippine numeracy research (Magtolis, 2023), the 4-point scores were classified as: Below Basic (score = 0), indicating minimal to no competency; Beginning (score = 1), indicating limited competency with significant gaps; Developing (score = 2), indicating approaching proficiency with partial mastery; and Proficient (score = 3), indicating mastery-level competency meeting grade-level expectations.

As this study involved secondary analysis of existing assessment data, the researcher did not administer the test and had limited access to instrument documentation. The assessment was conducted by school mathematics teachers following standardized procedures established by the Schools Division Office. This creates certain limitations—the researchers cannot verify administration consistency across schools, validate psychometric properties, or analyze specific test items. These constraints are inherent to secondary data analysis and were weighed against substantial benefits: the data represents official assessment results directly informing school-based decision-making, making them immediately relevant for intervention planning.

2.5 Data Gathering Procedure

Following approval from Eastern Samar State University and the Schools Division Office of Eastern Samar, the researcher secured institutional permission from all four participating schools through formal request letters. School mathematics coordinators identified and compiled completed Students' Numeracy Profile forms for all Grade 7 students. To maintain confidentiality, school personnel de-identified all forms by replacing student names with sequential numerical codes before releasing them to the researcher.

The numeracy assessment data were compiled into a Microsoft Excel master dataset, encoding school assignments (A, B, C, D), student code, and operational scores (0-3 scale) for all four operations. Data accuracy was verified through double-entry checking of 10% of randomly selected forms, with accuracy exceeding 99.5%. All 364 students had complete operational scores across all four operations, with no exclusions required. Data security followed standard research protocols: physical forms are stored in locked university file cabinets accessible only to the researchers, and electronic data are maintained in password-protected, encrypted files with regular backups.

2.6 Data Analysis

Numeracy assessment data were analyzed using descriptive and comparative statistics in Microsoft Excel. As this study examined the complete Grade 7 population rather than a sample, analysis focused on describing population parameters and examining meaningful differences without inferential hypothesis testing.

Descriptive statistics characterized overall proficiency levels by calculating the percentage of students scoring 3 (proficient) on the 0-3 scale for each operation. Frequency distributions showed how students distributed across all score levels (0-3) for addition, subtraction, multiplication, and division. These distributions provide the granular information necessary for intervention grouping decisions. Comparative analysis examined performance patterns across operations to establish a difficulty hierarchy and identify operations requiring prioritized intervention. School-level proficiency rates were calculated to inform differentiated programming, though the analysis deliberately avoids ranking schools or making value judgments about institutional performance.

Rather than applying inferential statistics to test hypotheses, this analysis emphasizes practical significance. The study interprets proficiency differences using educationally meaningful thresholds: minimal (< 10 percentage points), small (10-19), moderate (20-29), large (30-49), or very large (⩾50 percentage points). These categories enable identification of gaps warranting intervention attention. For a baseline assessment where the goal is describing actual competencies rather than generalizing to broader populations, this approach provides the actionable information needed for program planning.

2.7 Ethical Considerations

This study adhered to ethical research principles throughout all phases. Institutional approval was secured from Eastern Samar State University and the Schools Division Office of Eastern Samar prior to data collection. Permission to access de-identified numeracy assessment data was obtained from school principals through formal request letters acknowledging the research purpose, data use, and voluntary institutional participation.

Student confidentiality was maintained through multiple safeguards. All forms were de-identified by school personnel before researcher access—student names were replaced with numerical codes, and no personally identifiable information was collected or retained. School identifiers use pseudonyms (A, B, C, D) in all presentations. As this study involved secondary analysis of existing educational records collected through routine school assessment, it was classified as minimal risk research. Students experienced no additional burden, testing, or intervention beyond standard DepEd assessment protocols. Results are reported in aggregate form, with no individual student or specific school identification in publications or presentations.

All data will be retained securely for five years following study completion, after which electronic files will be permanently deleted and physical documents destroyed.

3. Results and Discussion

3.1 Overall Proficiency Levels in Fundamental Operations

Table 1 presents the proficiency distribution across four mathematical operations. Proficiency is defined as scoring 3 on the 0-3 scale, indicating mastery-level competency meeting grade-level expectations.

Table 1

Overall Proficiency Levels by Mathematical Operation

Operation	Below Basic (%)	Beginning (%)	Developing (%)	Proficient (%)	Below Proficient (%)
Addition	3.85	21.98	15.38	58.79	41.21
Subtraction	17.03	21.98	30.22	30.77	69.23
Multiplication	32.97	17.86	20.33	28.85	71.15
Division	30.77	21.43	25.55	22.25	77.75

Note. N = 364. Below Proficient combines Below Basic, Beginning, and Developing categories. Percentages may not sum to 100.00 due to rounding.

The findings reveal a clear hierarchical pattern of decreasing proficiency as operational complexity increases. Addition demonstrated the highest proficiency rate at 58.79%, followed by subtraction at 30.77%, multiplication at 28.85%, and division at 22.25%. This represents a 36.54 percentage point decline from addition to division proficiency. Conversely, the proportion of students requiring intervention increased systematically across operations, from 41.21% for addition to 77.75% for division. More than three-quarters of Grade 7 students lack mastery of division skills.

This hierarchical pattern aligns with the sequential nature of arithmetic skill development documented in mathematics education literature. The National Research Council (2001) emphasized that proficiency in basic operations develops sequentially, with mastery of simpler operations serving as prerequisite knowledge for more complex ones. Addition, as the most foundational operation, predictably showed the highest proficiency. However, the dramatic decline in proficiency for subsequent operations suggests significant challenges in building upon this foundation.

The subtraction proficiency rate of 30.77%—less than half the addition rate—indicates substantial difficulties with inverse operations despite their conceptual relationship to addition. Research on arithmetic development consistently documents that subtraction poses greater cognitive demands than addition, requiring more sophisticated mental representations and problem-solving strategies (Carpenter et al., 1981; Fuson, 1992). The current findings suggest that many Grade 7 students have not developed robust conceptual understanding of the addition-subtraction relationship.

The multiplication proficiency rate of 28.85% reflects the multiplicative reasoning challenges that emerge during the transition to middle school mathematics. Vergnaud (1988) identified multiplication as a conceptual threshold requiring students to shift from additive to multiplicative thinking—a cognitive reorganization that many students find difficult. The finding that 71.15% of students scored below proficient in multiplication suggests that most Grade 7 students have not successfully made this transition, potentially relying on repeated addition strategies rather than developing true multiplicative reasoning.

Division, with proficiency at 22.25%, represents the culmination of difficulties across all prior

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operations. As Hulbert et al. (2024) emphasized, division is the most complex fundamental operation, requiring integration of multiplication knowledge, understanding of inverse relationships, and facility with partitive and quotative division models. The finding that nearly four in five students lack division proficiency indicates severe deficits that will impede progress in virtually all subsequent mathematics domains, including fractions, ratios, proportions, algebra, and quantitative problem-solving.

Beyond overall proficiency rates, the distribution of students across the four performance levels reveals important patterns about the nature and severity of competency gaps. For addition, most students (58.79%) achieved proficiency, with relatively small proportions at Below Basic (3.85%) and Beginning (21.98%) levels. Multiplication demonstrated a particularly concerning pattern, with nearly one-third of students (32.97%) scoring at Below Basic—the highest proportion for any operation at this lowest performance tier. An additional 17.86% scored at Beginning, meaning that more than half of students (50.83%) demonstrated severely limited multiplication competency. Division showed a similar pattern to multiplication, with 30.77% at Below Basic and 21.43% at Beginning, totalling 52.20% of students with severely limited competency. However, division also had a notably larger proportion at Developing (25.55%) compared to multiplication (20.33%), suggesting that some students possess partial division understanding but lack the consistency and accuracy required for proficiency.

These distribution patterns align with research on learning progressions in mathematics, which emphasizes that students do not move uniformly through developmental stages but rather show varied trajectories influenced by instructional quality, prior knowledge, and cognitive factors (Clements & Sarama, 2014). The practical implication for extension program design is clear: interventions must be highly differentiated. Students at Below Basic and Beginning levels require foundational instruction focusing on conceptual understanding and procedural fluency with simple problems, while students at Developing need targeted practice with complex problem types and strategy refinement.

3.2 School-Level Proficiency Patterns for Intervention Planning

Table 2 presents proficiency rates disaggregated by school, revealing variation in numeracy performance that informs differentiated intervention design.

Table 2
Proficiency Rates by School and Operation

School	Addition (%)	Subtraction (%)	Multiplication (%)	Division (%)
A	56.84	20.00	17.89	3.16
B	77.89	29.47	31.58	24.21
C	89.74	73.08	55.13	35.90
D	16.67	8.33	15.63	28.13
Overall	**58.79**	**30.77**	**28.85**	**22.25**

Note. N = 364 total students across four schools (school enrollment ranged from 78-96 students). School identifiers (A, B, C, D) are pseudonyms to maintain institutional confidentiality. Percentages represent proportion of students scoring 3 (Proficient) on 0-3 scale.

The proficiency data reveal substantial variation across schools, indicating that intervention programming must be tailored to each school's specific baseline competencies rather than employing uniform approaches. Addition proficiency ranged from 16.67% to 89.74% across schools—a 73.08 percentage point range. Subtraction showed a 64.74 percentage point range (8.33% to 73.08%), multiplication a 39.50 percentage point range (15.63% to 55.13%), and division a 32.74 percentage point range (3.16% to 35.90%). This variation suggests that schools begin the intervention program at markedly different starting points, requiring differentiated strategies matched to actual baseline performance.

School A data show moderate addition proficiency (56.84%) but substantial decline in subsequent operations, with only 20.00% subtraction proficiency, 17.89% multiplication proficiency, and 3.16% division proficiency. This pattern suggests students possess basic computational skills but struggle with operational transfer and multiplicative reasoning. Intervention programming for School A should emphasize conceptual connections between operations and systematic development of multiplication and division competencies.

School B demonstrated relatively strong addition performance (77.89%) with consistent but moderate proficiency across other operations: subtraction (29.47%), multiplication (31.58%), and division (24.21%). This more balanced profile indicates students have foundational skills across all operations but require targeted support to achieve mastery. Intervention for School B can build upon existing competencies while addressing specific procedural and conceptual gaps through focused practice and error pattern analysis.

School C showed high proficiency rates across all operations: addition (89.74%), subtraction (73.08%), multiplication (55.13%), and division (35.90%). Despite these outcomes, substantial proportions of students still require intervention, particularly for multiplication (44.87% below proficient) and division (64.10% below proficient). Extension programming for School C should target students with specific competency gaps while providing enrichment opportunities for proficient students to deepen understanding and develop advanced problem-solving skills.

School D data indicate need for intensive foundational intervention. Addition proficiency stood at 16.67%, subtraction at 8.33%, multiplication at 15.63%, and division at 28.13%. With most students scoring below proficient across all operations, School D likely requires comprehensive programming that may need to begin with foundational concepts such as number sense, place value understanding, and basic computational strategies. The paradoxical pattern of higher division (28.13%) than multiplication (15.63%) proficiency warrants further investigation, as division conceptually depends on multiplication knowledge.

3.3 Distribution Patterns Across Proficiency Levels

While Table 2 established overall proficiency rates by school, understanding the complete distribution of students across all four proficiency levels is essential for designing appropriately calibrated interventions. Table 3 presents the percentage of students at each performance level (Below Basic, Beginning, Developing, Proficient) for each school and operation combination, providing the granular baseline data necessary for differentiated intervention planning.

The distribution patterns reveal important variations in how students cluster across proficiency levels, with direct implications for intervention grouping and instructional differentiation. For addition, Schools B and C show concentration at Proficient (77.9% and 89.7% respectively), with minimal proportions at Below Basic, indicating that most students possess adequate addition competency. In contrast, School D shows distribution spread across Beginning (39.6%) and Developing (31.3%) levels, while School A demonstrates bimodal distribution with concentrations at both Beginning (29.5%) and Proficient (56.8%). These patterns suggest that addition interventions for Schools B and C can focus on the minority requiring support, while Schools A and D require more extensive programming addressing varied competency levels.

Subtraction and multiplication distributions reveal more heterogeneous patterns across all schools. School A subtraction data show relatively even distribution across Below Basic (30.5%), Beginning (24.2%), Developing (25.3%), and Proficient (20.0%) levels, indicating highly diverse student competencies requiring multi-level intervention approaches. School D subtraction shows heavy concentration at Developing (47.9%), suggesting many students possess partial understanding requiring targeted refinement rather than foundational reteaching. For multiplication, particularly concerning patterns emerge in Schools A and D, where substantial proportions cluster at Below Basic (41.1% and 50.0% respectively), indicating that approximately half of students in these schools lack even elementary multiplication competency.

Table 3
Score Distribution by School and Operation

School	Operation	Below Basic (%)	Beginning (%)	Developing (%)	Proficient (%)
A	Addition	2.1	29.5	11.6	56.8
	Subtraction	30.5	24.2	25.3	20.0
	Multiplication	41.1	22.1	18.9	17.9
	Division	58.9	14.7	23.2	3.2
B	Addition	0.0	9.5	12.6	77.9
	Subtraction	20.0	22.1	28.4	29.5
	Multiplication	24.2	18.9	25.3	31.6
	Division	25.3	22.1	28.4	24.2
C	Addition	0.0	6.4	3.8	89.7
	Subtraction	1.3	9.0	16.7	73.1
	Multiplication	12.8	10.3	21.8	55.1
	Division	9.0	21.8	33.3	35.9
D	Addition	12.5	39.6	31.3	16.7
	Subtraction	13.5	30.2	47.9	8.3
	Multiplication	50.0	18.8	15.6	15.6
	Division	26.0	27.1	18.8	28.1

Note. N = 364 total students across four schools (school enrolment ranged from 78-96 students). Percentages calculated within each school. School identifiers are pseudonyms to maintain institutional confidentiality. Percentages may not sum to 100.0 due to rounding.

Division distributions present the most challenging profiles across all schools. School A shows concentration at Below Basic (58.9%), with only 3.2% achieving proficiency—a pattern indicating severe division deficits requiring intensive intervention starting with multiplicative reasoning foundations. School B demonstrates more balanced distribution across all levels, suggesting varied intervention needs from foundational to advanced. School C shows the largest proportion at Developing (33.3%), indicating students with partial division understanding requiring strategic practice and conceptual refinement. School D presents a paradoxical pattern with higher proficiency in division (28.1%) than in prerequisite multiplication (15.6%), warranting investigation into assessment or instructional factors. These proficiency distributions enable evidence-based decisions about intervention grouping, intensity, and instructional focus for each school.

3.4 Operation-Specific Competency Gaps and Cascading Failure

The systematic decline in proficiency across operations exemplifies what mathematics education researchers term cascading failure—a pattern wherein inadequate mastery of foundational skills prevents successful learning of subsequent, dependent skills (National Mathematics Advisory Panel, 2008). Each mathematical operation builds upon and assumes mastery of prior operations. Subtraction assumes addition fluency; multiplication assumes understanding of additive relationships; division assumes multiplication competency. When students lack these prerequisites, they cannot successfully engage with instruction in the dependent skills, producing compounding deficits that widen over time.

The current findings provide clear evidence of cascading failure among Grade 7 students. The 41.21% of students lacking addition proficiency face inevitable difficulty with subtraction, which conceptually requires addition knowledge. The 69.23% lacking subtraction proficiency cannot develop robust multiplication understanding. The 71.15% lacking multiplication proficiency cannot master division, which fundamentally depends on multiplicative relationships. Each operational deficit feeds forward, producing the increasingly severe competency gaps observed in the data.

This cascading pattern has important implications for intervention design. Research suggests that students with gaps in foundational operations often struggle to benefit from grade-level instruction in more advanced topics (National Mathematics Advisory Panel, 2008). When students lack prerequisite skills such as multiplication fluency, instruction in dependent operations like division may be less effective. These findings underscore the importance of diagnostic assessment and differentiated instruction that addresses foundational gaps systematically rather than proceeding with grade-level content that assumes unmet prerequisites.

4. Conclusions and Recommendations

Based on the baseline assessment, it is concluded that most Grade 7 students in Salcedo lack essential foundational numeracy skills, as although many demonstrate proficiency in addition, approximately seven out of ten struggles with subtraction, multiplication, and division—key operations for higher mathematical learning. Among these, multiplication and division emerge as the most critical areas for intervention due to the high concentration of students performing at Below Basic and Beginning levels, indicating weak multiplicative reasoning. The observed decline in proficiency from addition to division reflects a pattern of cascading failure, where insufficient mastery of basic skills hinders the acquisition of more complex competencies, emphasizing the need to address foundational gaps first. Moreover, significant variation in proficiency levels across schools highlights the necessity for differentiated and context-specific interventions rather than uniform programs. These findings provide a strong empirical basis for ESSU's extension initiatives, guiding targeted instructional strategies, student grouping, and intervention design. In response, it is recommended that ESSU implement a differentiated, multi-tiered intervention program tailored to students' competency levels, develop school-specific plans based on identified needs, and prioritize conceptual and procedural understanding in multiplication and division using varied instructional approaches. Additionally, systematic progress monitoring through formative assessments should be established to ensure continuous improvement and program effectiveness. Future research should focus on evaluating the impact of these interventions, examining factors contributing to school-level differences in performance, expanding the assessment to include broader numeracy domains such as fractions and problem-solving, and replicating the study in other municipalities to inform wider educational planning.

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