



## Current Status in the Delivery of Instruction of General Mathematics in Senior High School: A Case Study

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### Abstract

Mathematics, as a school subject, is consistently evaluated as one of the hardest, and Filipino students always rank the lowest in the world in mathematics proficiency examinations. This study looked into the situation of Instructional Delivery in General Mathematics for Senior High School students in one of the schools in Cebu. The study used a descriptive quantitative design, collecting data through document analysis and student surveys to evaluate teaching, content delivered, and student learning outcomes in a grounded manner. Based on the data, findings indicate that only 18% of the General Mathematics content standards were covered in instruction, a mere fraction exposing severe gaps in the implementation of the curriculum, and the resulting competencies. This also implies that current instructional materials and methods fail to meet the subject's cognitive and applied dimensions. This lack of sufficient material is the reason the Instructional Delivery, Content Standards, and Assignments Per Curriculum Published Guide need to be revised. Furthermore, for teachers to improve their instructional and pedagogical methods, curriculum integration of instruction, learning technologies, and student engagement in active learning to improve their understanding, professional development is critical. Creating a friendly and encouraging atmosphere where students feel engaged is necessary for maintaining motivation and self-assurance in mathematics. It is also important to have ongoing assessments in place, along with feedback, to measure progress and ascertain that instructional goals are achieved appropriately. Last but not least, enhancing mathematics instruction is vital in closing the learning gaps, developing students' higher-order thinking and preparing them for the mathematics they need to apply in real life as well as in their further studies.

**Keywords:** case study, delivery of instruction, teaching, General Mathematics, senior high school



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## INTRODUCTION

In the field of education, the Philippines faces a significant challenge: the performance of students in mathematics lags behind international standards. The Philippines ranked second to last out of 79 countries in mathematics literacy in the 2018 Programme for International Student Assessment (PISA) results. Filipino students scored significantly lower than the OECD average. Only 20% of students met the required competency level (Level 2) in Mathematics Literacy (Balagtas, 2020; Callaman and Itaas, 2020). Furthermore, the Philippines scored the lowest in the 2019 Trends in International Mathematics and Science Study (TIMSS) grade 4 mathematics

and science assessments, with only 19% of Filipino pupils achieving basic proficiency in Mathematics (Ablian & Parangat, 2022).

Students' poor performance in different aspects of mathematics, including content and procedural knowledge, computational abilities, visualization, and problem-solving, is linked to several factors. These include insufficient mastery of basic skills, persistent stigma, language barriers (Jaudinez, 2019), and the absence of effective learning strategies (Gafoor, A. & Kurukkan A., 2015).

The study was conducted through document analysis, a systematic approach to thoroughly evaluate instructional materials. The objective

was to obtain an adequate understanding of the current condition of instructional delivery in General Mathematics.

## LITERATURE REVIEW

Learning competencies in mathematics are typically outlined in educational standards and curriculum to aid teachers and students through the learning process. These encompass an extensive range of knowledge, skills, and abilities that students acquire and apply in their mathematical learning experience. The Department of Education (DepEd) has outlined the Most Essential Learning Competencies (MELCs) for General Mathematics. The learning competencies are intended to equip students with the necessary knowledge for both higher education and the workplace. These competencies go beyond simple calculations and equations. They include the capacity to comprehend difficult mathematical concepts, think critically, analyze problems, and apply a variety of problem-solving techniques. These skills are critical for success not only in mathematics but also in other academic, professional, and everyday life contexts where mathematical thinking and problem-solving are required.

A fundamental aspect of learning competencies in mathematics is mathematical literacy. Students must possess these abilities in order to confront real-life mathematical challenges and make decisions that are more accurate. Mathematical literacy includes the ability to reason mathematically, apply mathematical concepts, interpret data, and communicate mathematical ideas effectively. According to the Organization for Economic Co-operation and Development (OECD), mathematical literacy is the capacity to formulate, employ, and interpret mathematics in various contexts (OECD, 2019). The terms "formulate," "employ," and "interpret" provide a meaningful structure for organizing mathematical processes. Figure 1 illustrates the framework for mathematical literacy in practice. Mathematical literacy is the ability to reason mathematically and use mathematical concepts, techniques, facts, and tools to

describe, explain, and predict occurrences. It enables individuals to understand the importance of mathematics in the world and to make informed decisions as active and reflective citizens (Ndiaye, 2019, p. 31). Teaching mathematical literacy demands a pedagogical approach that prioritizes real-world contexts, values understanding over memorization, and emphasizes depth over breadth (Ndiaye, 2019, p. 35). Application and modeling play crucial roles in effective mathematical literacy instruction (Ndiaye, 2019, p. 36). Moreover, an interdisciplinary approach is vital for students to grasp the numerical components of applications (Ndiaye, 2019, p. 36). Technology should be integrated organically throughout the curriculum to enhance mathematical literacy instruction (Ndiaye, 2019, p. 35). Another effective approach is engaging students in small collaborative groups (Ndiaye, 2019, p. 37).

In the mathematical literacy classroom, educators should extend beyond traditional mathematics and inspire students by offering essential guidance and additional questions, thereby granting students ownership of their work (Ndiaye, 2019, p. 35). By creating learning activities that enable students to apply both their real-life and classroom experiences, teachers can promote effective learning (Ndiaye, 2019, p. 38). The National Research Council (NRC, 2012) states that mathematical literacy is strongly connected to 21st-century skills, including critical thinking, problem-solving, decision-making, communication, media literacy, and information literacy (Ndiaye, 2019, p. 13).

## METHODS

The initial phase involved document analysis, systematically examining written instructional materials associated with the teaching and learning of General Mathematics. The primary aim was to discern the current state of instructional delivery and unveil patterns, themes, and trends in instructional strategies. The strategic use of document analysis provided a focused and insightful lens, facilitating an in-depth assessment of General

Mathematics instruction. A survey questionnaire was administered for quantitative data collection, with subsequent analyses encompassing both descriptive and frequency assessments.

The study was conducted in one of the Schools at Minglanilla, Cebu. This institution offered a range of educational programs encompassing Senior High School, Technical Vocational Education, and College-level courses. Notably, the school is a Catholic institution. This rich heritage reflected the school's commitment to providing holistic education.

This study's participants were Senior High School Grade 11 students currently enrolled in the General Mathematics course for the first semester of SY 2023-2024. Out of a total population of 80 senior high school Grade 11 students, only 70 voluntarily chose to join in the study. The remaining 10 students declined for several reasons, including lack of interest, fear of answering questions related to mathematics, and other personal priorities. These participants shared common characteristics, including their age range of approximately 15 to 20 years old and their shared educational level in Grade 11. They represented a diverse and important group whose willingness to engage in the study in the context of General Mathematics provided useful insights into the application of design thinking as an innovative approach for enhancing the delivery of instruction in learning mathematics. Also involved in the study were three (3) full-time faculty members who taught General Mathematics course. These teachers participated in creating a design-thinking lesson plan prototype.

Rather than employing typical sampling methods, this research adopted total population sampling, which falls under purposive sampling. Total population sampling involves studying the entire population of interest, ensuring that every qualified individual within the defined group is included in the study. This method aimed to gather comprehensive insights from all participants regarding their experiences within the given environment.

To address the research questions, the researcher utilized four purposefully crafted research instruments. The survey questionnaire was designed to align with the Most Essential Learning Competencies (MELCs) in General Mathematics and aimed to collect demographic information from students, along with their perceptions of achieving learning competencies in General Mathematics. The questionnaire used a modified four-point Likert scale, with the following point assignments: strongly agree = 4 points, agree = 3 points, disagree = 2 points, and strongly disagree = 1 point.

A comprehensive document analysis was conducted to examine the current condition of instructional delivery in General Mathematics. This included reviewing pertinent written material on the teaching and learning processes. Specific criteria were established to evaluate the instructional materials' effectiveness in addressing the targeted parameters. A modified four-point Likert scale was used, with the following point categories: excellent (4 points), agree (3 points), satisfactory (2 points), and need for improvement (1 point).

## RESULTS

### Learning of the Mathematics Content

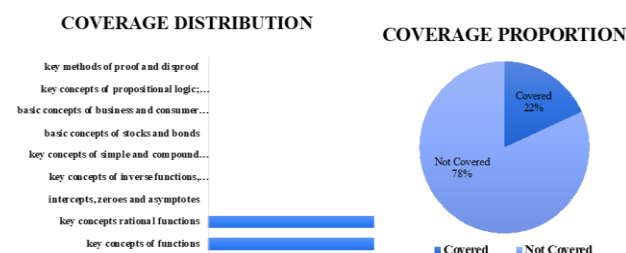
**Review of Classroom Instruction Documents.** A comprehensive document analysis was conducted to evaluate the current state of instructional delivery in teaching General Mathematics. This involved an examination of written materials related to teaching and learning. Based on the data presented in Table 1, it is apparent that only a limited portion of the content outlined in the General Mathematics Curriculum Guide of 2016 has been covered. Specifically, the topics covered concepts related to functions and rational functions, while neglecting areas such as intercepts, zeroes, asymptotes, inverse functions, exponential functions, logarithmic functions, basic business mathematics, and logic. This gap in curriculum coverage highlights potential issues in

instructional alignment and delivery, which can affect overall learning outcomes (OECD, 2019).

**Table 1**  
*Comparison of Content Standard to Content Delivered in General Mathematics*

CONTENT Lifted from the Curriculum Guide, 2016	CONTENT STANDARD Lifted from the Curriculum Guide, 2016	CONTENT DELIVERED
Functions and Their Graphs	1. important ideas related to functions	Representing real life situations Evaluating a Function Operations and Composition of Functions
	2. fundamental ideas of rational functions	Rational Functions <i>Except intercepts, zeroes and asymptotes</i>
	3. important ideas in logarithmic, exponential, and inverse functions	Not covered
Basic Business Mathematics	1. fundamentals of simple and compound interests, and basic and broad annuities	Not covered
	2. fundamentals of equities and bonds	Not covered
	3. fundamentals of consumer and business loans	Not covered
Logic	1. essential elements of propositional logic: syllogisms and fallacies	Not covered
	2. proof and disproof techniques	Not covered

**Content Coverage Analysis.** Only a small percentage of the content specified in the 2016 General Mathematics Curriculum Guide has been sufficiently instructed. Specifically, only 22%, or two of the nine major content standards, have been sufficiently covered. On the other hand, a significant 78% of the curriculum content has been neglected, indicating considerable deficiencies in the way instruction is delivered.



**Figure 1**  
*Coverage Status of the Content Standard. Left: Distribution. Right: Proportion*

Figure 1 provides a clear visual representation of this disparity. On the left, the bar chart illustrates the distribution of the nine content standards, where only two bars reach the "covered" area, indicating the limited scope of content addressed. The right-hand pie chart further emphasizes this imbalance, with 78% of the curriculum left unaddressed, underscoring

the urgent need for more comprehensive content coverage to meet the requirements of the curriculum and promote effective learning outcomes (OECD, 2019).

**Analysis of Instructional Material.** The tables below present the evaluation of the teacher-made instructional materials for topics related to functions and rational functions, developed by two General Mathematics teachers. The evaluation focused on three key areas: learning objectives, learning content, and test items and assessment tasks. Each criterion was rated on a 1-4 scale, with 1 being the lowest and 4 being the highest, to evaluate the instructional materials. The scores highlight both strengths and areas requiring attention, with an overall average calculated for each criterion. This approach aligns with international standards that emphasize the importance of high-quality instructional materials in enhancing learning effectiveness and ensuring curriculum alignment (OECD, 2019).

**Table 2**  
*Evaluation of Teacher-made Instructional Materials in terms of Learning Objectives*

The learning objective is...	Average Score	Description
1. specifically stated what the learner is expected to learn.	1.00	Needs Improvement
2. specific to the lesson.	1.25	Needs Improvement
3. describes the conditions under which the learning will take place.	1.00	Needs Improvement
4. relevant to the learning session.	1.13	Needs Improvement
5. achievable and within the time frame.	1.00	Needs Improvement
6. formulated based on the classification of learning into three domains: cognitive, psychomotor, and affective.	1.00	Needs Improvement
7. appropriate to the age level and experiential background of the students (principles of readiness).	1.13	Needs Improvement
8. related to the needs and interests of the students (principle of motivation).	1.13	Needs Improvement
9. in harmony with the content standards provided by regulatory requirements.	1.25	Needs Improvement
10. consistent with the general goals of the school.	1.00	Needs Improvement

\*Legend: 3.51 - 4.00 (Excellent); 2.51 - 3.50 (Good); 1.51 - 2.50 (Satisfactory); 1.00 - 1.50 (Needs Improvement)

**Learning Objectives.** The learning objectives do have issues relating to clarity and focus (Table 2). Where these objectives are supposed to be a guiding framework to help students focus on what is to be learned. Mager (1997) argues that learning objectives have to state what behaviors are expected from students, what the conditions are under which the behaviors are to be performed, and the parameters within which

the behaviors will be evaluated. The lack of these components makes learning objectives vague and does not help the teacher in formulating a lesson which is meaningful, or in assessing learning. Objectives also fail to specify the conditions of learning (e.g. whether activities will be done in groups or alone) and this hinders, deters and delays the evaluation of learning activities (Anderson & Krathwohl, 2001).

Objectives do not appear to align with all components of a holistic learning framework, i.e. cognitive, psychomotor, and affective domains. Objectives also seem to be unrealistic and do not match students' development, interest and institutional expectations. This could lead to lower motivation, and less engagement and learning. One of the hallmarks of effective learning objectives is that there is a direct correlation with learning outcomes and engagement (Biggs and Tang 2011).

**Table 3**  
*Evaluation of Teacher-made Instructional Materials in terms of Learning Contents*

The learning content ...	Average Score	Description
1. is aimed at leading the learners from the known to the unknown.	3.00	Good
2. is relevant, meaningful, engaging, and context specific.	1.75	Satisfactory
3. is sufficiently challenging in order to satisfy learners' motivation.	1.75	Satisfactory
4. has appropriate teaching methods to support the achievement of the learning objectives.	1.25	Needs Improvement
5. uses learning methods that reflect its suitability about the content of the learning required.	1.63	Satisfactory
6. uses stories and metaphors to bring life and color to the process of learning.	1.00	Needs Improvement
7. has appropriate learning materials that fosters inclusivity and is accessible.	1.25	Needs Improvement
8. has a variety of learning activities, in an attempt to better meet learners' needs.	1.13	Needs Improvement
9. utilizes educational apps, online materials, and interactive resources to improve the learning process.	1.00	Needs Improvement

\*Legend: 3.51 - 4.00 (Excellent); 2.51 - 3.50 (Good); 1.51 - 2.50 (Satisfactory); 1.00 - 1.50 (Needs Improvement)

**Learning Content.** The evaluation of learning content in Table 3 shows a mix of strengths and areas for improvement. While some aspects are rated satisfactory or good, there is significant room for growth in making the content more engaging, inclusive, and aligned with teaching practices.

The evaluation of learning content shows strengths, notably, scaffolding from students' prior knowledge, as well as critical gaps concerning engagement, relevance, and alignment with learning goals. Building on prior knowledge to aid comprehension and retention is well documented (Kikas et. al., 2021). However, content that is conditionally relevant or superficially engaging weakly motivates learners. Research in higher education documents declining student engagement when teaching materials, activities, or contexts are misaligned with students' backgrounds or interests (Shemshack & Spector, 2020; Lomellini, Lowenthal, Snelson et al., 2025). The gaps between methods and objectives have been noted in constructive alignment as well, where learning outcomes are obscured if teaching strategies, assessment practices, and content lack coherence (He, Krajcik, & Schneider, 2023).

Further, recent studies emphasize how the different needs of learners and the motivations and retention of learners advocate the use of flexible, inclusive and accessible resources, diverse activities, and digital tools, and the use of diverse pedagogies. For example, research on inclusive pedagogy in STEM workshops showed that, among other benefits, adopting flexible, culturally responsive, and diverse teaching materials and modalities helps in improving the classroom atmosphere and success of learners. Other research on online learning elucidates that the integration of accessibility features, such as varying representation, flexible forms of assessment, and other digital resources, is correlated with strong engagement and equitable learning outcomes. Resources aimed at learners should consciously use explanatory metaphors or narratives, offer varying types of learning activities, educational apps and instructional technology, and diverse, as well as inclusive materials in both context and form.

**Test items and assessment tasks.** The evaluation of test items and assessment tasks, as shown in Table 4, shows both strengths and weaknesses. While some aspects like

alignment with standards are strong, areas like clarity, time limits, and grading consistency need improvement.

**Table 4**  
*Evaluation of Teacher-made Instructional Materials in terms of Test Items and Assessment Tasks*

The test items and assessment tasks...	Average Score	Description
1. have a set of specifications and the most appropriate types of test items and assessment tasks are constructed that meets the specification.	1.00	Needs Improvement
2. are aligned with the content standard defined by regulatory requirements.	3.48	Good
3. correspond to the course content and curriculum	2.23	Satisfactory
4. provide the most balanced measure of the intended learning outcome.	1.19	Needs Improvement
5. have clear directions.	1.50	Satisfactory
6. use simplified reading vocabulary and sentence structure.	2.33	Satisfactory
7. have clear statements.	1.57	Satisfactory
8. have adequate time limits provided to elicit responses from the students.	1.25	Satisfactory
9. are adequately constructed	1.44	Satisfactory
10. are properly arranged.	1.57	Satisfactory
11. show unidentifiable patterns.	1.94	Satisfactory
12. have consistent expectations and grading criteria.	1.07	Needs Improvement

\*Legend: 3.51 - 4:00 (Excellent); 2.51 - 3.50 (Good); 1.51 - 2.50 (Satisfactory); 1.00 - 1.50 (Needs Improvement)

While the alignment with content standards shows relative strength, the evaluation of test items reveals significant weaknesses regarding item specifications, balance of assessed outcomes, and grading consistency. The score of 1.00 on specifications indicates very poorly defined and planned elements, an issue that the literature points out should be addressed through more rigorous item-writing standards to bolster clarity, validity, and fairness (Rudolph et al., 2019). The high score on alignment with curriculum standards (3.48) shows that teachers know the content domains and try to reflect curricular expectations, an approach that correlates with literature on constructive alignment between assessment and curriculum (Khan et al., 2025). That said, the modest score (2.23) for correspondence to course content indicates that coverage is likely partial, leaving unassessed gaps in the complete range of material that was taught.

The issues with the low indicators from the "balanced measurement of learning outcomes" domain [1.19] are worse. It shows that the assessments are biased to certain cognitive

levels or types of knowledge while ignoring others. This finding resonates with the literature on assessments that critique the narrow coverage of outcomes (Gyll & Ragland, 2018). Other issues such as weak clarity of directions (1.50), ambiguous vocabulary (2.33), and problematic phrasing of statements (1.57) collectively undermine the quality of the items, leading to potentially confused and misinformed students. The consequences of possibly poorly defined time limits (1.25) may pressure students which potentially diverts performance from mastery to speed. The lowest reliability of grading criteria (1.07) may imply either inconsistent expectations or arbitrary marking without clear rubrics, which resonates with the literature that advocates for clear and cohesive scoring guides to reduce bias (e.g. Wesolowski, 2020). Overall, revisions to improve the reliability and fairness of the assessments will require refinements to outline clear expectations for items and broaden response outcomes, improve clarity, and include transparent and cohesive grading criteria.

The evaluation highlights several key areas where teacher-made instructional materials need improvement: The objectives need to be significantly revised. They lack clarity, specificity, and fit with both instructional topic and student requirements. The objectives also do not cover essential learning domains and are unrealistic given the instructional setting. Improving these objectives is critical for ensuring that both teachers and students understand the objectives, which will improve the learning experience and outcomes.

While the content is effective at introducing new concepts, it lacks engagement, diversity, and accessibility. Significant improvements are required in areas such as employing metaphor, creating diversity, providing diverse activities, and incorporating digital technologies to improve student learning and outcomes.

Good alignment with subject requirements is a strength, but weaknesses in structure, clarity, time restrictions, and grading uniformity must be addressed. Improving test design, offering

clearer instructions, and establishing consistent grading methods are critical for effective evaluations of student performance.

**Acquisition of the Required Competencies.**

Table 5 shows the perceptions of seventy (70) students on their acquisition of skills across numerous topics of General Mathematics, using a 4-point scale. The findings show a significant variation in mastery of different mathematical concepts, with some areas showing relatively higher competency and others demonstrating substantial discrepancies.

The survey results indicate areas where students feel more confident in their abilities, particularly in basic functions and rational functions. This may suggest that the instructional methods used for these topics are effective in facilitating student understanding.

**Table 5**  
*Weighted Average of the Acquisition of MELCs in General Mathematics*

Content Standard	Most Essential Learning Competencies	Weighted Average	Weighted Description
<b>Functions and Their Graphs</b>			
Key Concepts of Functions	1. represent real-life situations using functions, including piece-wise functions	2.80	Competent
	2. evaluate a function	3.00	Competent
	3. perform addition, subtraction, multiplication, division, and composition of functions	3.40	Highly Competent
	4. solve problems involving functions	3.00	Competent
	5. represent real-life situations using rational functions	2.80	Competent
Key Concepts Rational Functions	6. distinguish rational function, rational equation, and rational inequality	2.80	Competent
	7. solve rational equations and inequalities	2.90	Competent
	8. represent a rational function through its: (a) table of values, (b) graph, and (c) equation	2.80	Competent
	9. find the domain and range of a rational function	3.00	Competent
	10. determine the: (a) intercepts; (b) zeroes; and (c) asymptotes of rational functions	2.50	Barely Competent
	11. solve problems involving rational functions, equations, and inequalities	2.80	Competent
	12. represent real-life situations using one-to-one functions	2.50	Barely Competent
	13. determine the inverse of a one-to-one function	2.30	Barely Competent
	14. represent an inverse function through its: (a) table of values, and (b) graph	2.40	Competent
	15. find the domain and range of an inverse function	2.40	Competent
Key Concepts of Inverse Functions, Exponential Functions and Logarithmic Functions	16. solve problems involving inverse functions	2.30	Competent
	17. represent real-life situations using exponential functions	2.40	Competent
	18. distinguish between exponential function, exponential equation, and exponential inequality	2.40	Competent
	19. solve exponential equations and inequalities	2.50	Competent
	20. represent an exponential function through its: (a) table of values, (b) graph, and (c) equation	2.50	Competent
	21. find the domain and range of an exponential function	2.50	Competent
	22. determine the intercepts, zeroes, and asymptotes of an exponential function	2.40	Competent
	23. solve problems involving exponential functions, equations, and inequalities	2.50	Competent
	24. represent real-life situations using logarithmic functions	2.00	Competent
	25. distinguish logarithmic function, logarithmic equation, and logarithmic inequality	2.00	Competent
	26. solve logarithmic equations and inequalities	2.00	Competent
	27. represent a logarithmic function through its: (a) table of values, (b) graph, and (c) equation	1.90	Competent
	28. find the domain and range of a logarithmic function	2.00	Competent
	29. determine the intercepts, zeroes, and asymptotes of logarithmic functions	1.90	Competent
30. solve problems involving logarithmic functions, equations, and inequalities	2.00	Competent	
<b>Basic Business Mathematics</b>			
Key Concepts of Simple and Compound Interests, and Simple and General Annuities	31. illustrate simple and compound interests	2.00	Barely Competent
	32. distinguish between simple and compound interests	2.00	Competent
	33. compute interest, maturity value, future value, and present value in simple interest and compound interest environment	1.80	Competent

Key Concepts of Simple and Compound Interests, and Simple and General Annuities	34. solve problems involving simple and compound interests	1.90	Barely Competent
	35. illustrate simple and general annuities	1.80	Barely Competent
	36. distinguish between simple and general annuities	1.70	Not Competent
	37. find the future value and present value of both simple annuities and general annuities	1.60	Not Competent
	38. calculate the fair market value of a cash flow stream that includes an annuity	1.70	Not Competent
Basic Concepts of Stocks and Bonds	39. calculate the present value and period of deferral of a deferred annuity	1.70	Not Competent
	40. illustrate stocks and bonds	1.70	Not Competent
	41. distinguish between stocks and bonds	1.70	Not Competent
	42. describe the different markets for stocks and bonds	1.80	Barely Competent
	43. analyze the different market indices for stocks and bonds	1.90	Competent
Basic Concepts of Business and Consumer Loans	44. illustrate business and consumer loans	1.90	Competent
	45. distinguish between business and consumer loans	1.90	Competent
	46. solve problems involving business and consumer loans (amortization, mortgage)	1.80	Competent
<b>Logic</b>			
key concepts of propositional logic, syllogisms and fallacies	47. illustrate and symbolize propositions	2.00	Barely Competent
	48. distinguish between simple and compound propositions	1.90	Barely Competent
	49. perform the different types of operations on propositions	2.10	Competent
	50. determine the truth values of propositions	2.00	Competent
	51. illustrate the different forms of conditional propositions	1.90	Competent
	52. illustrate different types of tautologies and fallacies	1.90	Barely Competent
	53. determine the validity of categorical syllogisms	1.80	Barely Competent
	54. establish the validity and falsity of real-life arguments using logical propositions, syllogisms, and fallacies	1.80	Barely Competent

\*Legend: 3.26 - 4.00 (Highly Competent), 2.51 - 3.25 (Competent), 1.76 - 2.50 (Barely Competent), 1.00 - 1.75 (Not Competent)

However, the results highlight a widespread lack of competency in critical areas such as intercepts, zeroes, asymptotes, inverse, exponential and logarithmic functions, basic business mathematics, and logic indicate significant gaps in student competency in these essential areas in the curriculum.

The results for this study appear consistent with other work within the field of education. For example, the studies mention students face various challenges surrounding the teaching and learning of exponentials and logarithmic functions and note the difficulties seem to stem from conceptual understandings and weaknesses with applying these functions to different situations Campo-Meneses et al. (2023). The aforementioned gaps highlights the necessity of formulating teaching and learning activities that transcend the covering basic definitions.

**Competency in Functions and Rational Functions.**

The data indicates students have proficient skills in the foundational parts of functions, like basic operations and composition, along with self-assessment scores, which indicate proper instruction and understanding in these areas. At the same time, evaluating and solving function-related problems, as well as determining domains and

ranges, showed a moderate level of competency. Challenges remain with more advanced material, especially with identifying the intercepts, zeros, and asymptotes of rational functions. Campo-Meneses et al. (2023) argue that the grasp of more complex relationships embedded in exponential, logarithmic, and rational functions needs several manifestations and contexts which, unfortunately, many curricula do not support sufficiently.

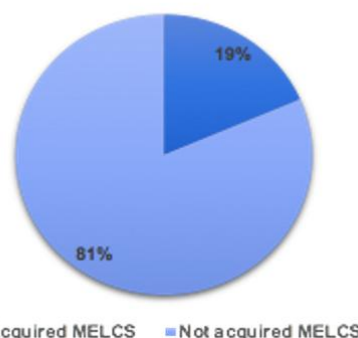
**Low Mastery of Inverse, Exponential, and Logarithmic Functions, Basic Business Mathematics and Logic.** The findings shed light on students' problematic understanding of fundamental mathematical principles, especially with inverse, exponential, and logarithmic functions, alongside foundational business mathematics and logic. The students' self-assessment scores on the solving of inverse and logarithmic functions and the application of exponential functions in real-life situations cannot be used as indicators of mastery and indicate problems not only of understanding the concepts but also of symbol manipulation, issues which the research on mathematics education has documented (Campo-Meneses et al., 2023). Also concerning the weaker performances in the basic business mathematics topics of interest and annuity and cash flow valuation were the lack of application reach instruction which limited the students' ability to abstract mathematics and connect it to the higher-framing problem of financial literacy, and real-world problem solving. In addition, the lower order coping with the logical components of the propositions and the syllogisms resonates with the findings of earlier research which explains the lack of logic and critical thinking to be a problem in the secondary and tertiary mathematics education. All these points to the need for instruction and mastery of the mathematics with logical components to be integrated, aligned, and curriculum centered.

These findings, illustrated in Table 5, highlight a considerable gap in student mastery of the essential competencies in General Mathematics. Out of the 54 identified

competencies, students have successfully acquired only 10 competencies, representing just 18.52% of the total. While a significant 44 competencies, or 81.48%, remain unmastered. This discrepancy is visually emphasized in Figure 6, which clearly illustrates the large imbalance between acquired and not acquired competencies.

This limited level of competency acquisition is closely tied to the insufficient coverage of the 2016 General Mathematics Curriculum Guide. The lack of coverage across key content areas directly impacts students' ability to develop a deeper understanding and proficiency in essential mathematical concepts, underscoring the need for a more comprehensive and balanced approach to curriculum delivery.

### Competency Acquisition Rates



**Figure 6**  
*Competency Acquisition Rate*

### DISCUSSION

Only two of the nine General Mathematics content standards were satisfactorily covered, with a concentration on functions and rational functions, but important topics such as intercepts, zeroes, asymptotes, inverse, exponential and logarithmic functions, business math, and logic were overlooked. Teacher-made instructional materials on functions and rational functions were aligned with standards, but there was need for improvement in learning objectives, content preparation, and test item development.

Significant gaps were identified in the curriculum coverage of General Mathematics,

indicating that essential topics are not adequately addressed. These results reflect the poor development of fundamental mathematical concepts for the students. Moreover, time constrains greatly challenged teachers to deliver quality instruction. This limitation has a significant impact on the comprehensiveness and scope of instruction, making it difficult for teachers to offer comprehensive lessons that meet students' learning needs. To address these issues, it is crucial for teachers to revisit the curriculum and adjust their instructional methods. Implementing the full 80-hour timeframe for the course is essential to ensure all necessary areas are thoroughly covered. By doing so, teachers can provide more balanced and detailed instruction, allowing students to achieve a comprehensive understanding of general mathematics. Implementing these changes will allow students to have a more comprehensive and substantial mathematical foundation, better preparing them for future academic challenges and practical applications of mathematics.

The instructional materials and assessment methods used by teachers require significant improvements to enhance their effectiveness. Currently, teacher-made instructional materials often lack clarity in learning objectives, fail to make the content relevant and engaging, and do not sufficiently accommodate diverse learner needs. Additionally, the assessment methods in use may not accurately measure student progress or provide actionable feedback. To address these issues, it is essential to develop high-quality instructional materials with clear, specific learning objectives. These materials should provide comprehensive content that is relevant and engaging for students, making the lessons more relatable and interesting. Furthermore, the assessment tools must be well-constructed to accurately measure student progress, offering insights that can guide further instruction. By improving the quality of instructional materials and assessment methods, teachers can better support student learning. High-quality materials will make lessons more understandable and engaging,

thereby enhancing overall educational outcomes. Investing in the development and continuous improvement of these resources is crucial for fostering an inclusive and effective learning environment.

The findings revealed a significant issue: most students are not achieving the essential learning competencies in General Mathematics. There is a marked disparity in students' mastery of mathematical concepts, particularly in challenging topics, such as exponential and logarithmic functions and business mathematics. Surprisingly, the study found that only 16 hours out of the 80-hour allocated timeframe for the subject were actually implemented. This inadequate time management severely impacts teachers' ability to develop comprehensive learning plans and provide varied learning tasks to address diverse student needs. As a result, students struggle to grasp fundamental concepts, leading to gaps in their mathematical understanding and proficiency. These findings indicate a pressing need to implement and adhere to the full 80-hour timeframe for General Mathematics. Ensuring that the entire allocated time is utilized will allow teachers to deliver a more thorough and varied curriculum. Additionally, better time management and planning will enable teachers to accommodate to various ways of learning, ultimately helping students achieve the essential competencies required for success in mathematics.

As a result, it is recommended to review the curriculum to verify that all critical learning competencies are addressed, particularly in areas that are currently underrepresented. Moreover, develop and implement high-quality instructional materials with clear, attainable learning objectives, dynamic content, and well-designed assessments that assure curriculum alignment and support students' different learning needs. Ensure comprehensive coverage of all learning competencies, particularly those underrepresented areas.

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