International Journal of Multidisciplinary Research and Publications
ISSN (Online): 2581-6187

SUMBACC (Supplemental Material in Basic Arithmetic in Community - Centric): Enhancement of Cultural Awareness and Mathematical Proficiency of Grade 7

Ma Jane Andaya Antonio
Laguna State Polytechnic University Sta. Cruz Laguna 4009 PHILIPPINES
Email address: julierosemendoza002@gmail.com

Abstract— *The study determines the acceptability of the SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric), its relationship to cultural awareness, and its effect on enhancing the mathematical proficiency of Grade 7 students. It sought to determine the level of the SUMBACC (Supplemental Material in Basic Arithmetic in Community- Centric) in terms of components and characteristics, the level of the cultural awareness, the level of the mathematical proficiency, the significant relationship between the SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) and the cultural awareness; and the significant effect between the SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) on the mathematical proficiency. The study employed the descriptive quantitative design to examine the characteristics of the population without manipulating variables. By measuring the cultural awareness of students in Grade 7, it collected numerical data to determine trends, patterns, and relationships. Purposive Sampling was used to select 93 respondents from Jasmine and Daisy at Pagsanjan Integrated National High School, who participated in the survey and assessment for Academic Year 2024–2025. Findings revealed that SUMBACC as to components and characteristics were verbally interpreted as Acceptable by the Grade 7 students, indicating its positive reception and instructional value. The level of cultural awareness were rated as Aware to Highly Aware. The level of mathematical proficiency were interpreted as fairly satisfactory. The study found out that there is a significant relationship between the SUMBACC and the cultural awareness, but no significant effect between the SUMBACC on the mathematical proficiency of Grade 7. The SUMBACC demonstrated a significant relationship with the cultural awareness, thus, the null hypothesis is rejected. However, the SUMBACC did not yield significant effect on mathematical proficiency of Grade 7, resulting in the acceptance of the null hypothesis. It implies that while SUMBACC foster the utilization of community-centric themes, additional instructional support is necessary to strengthen mathematical performance. Based on the results and conclusions, it is recommended that the implementation of SUMBACC may be expanded to other sections or grade levels within the school to assess its broader applicability and effectiveness in diverse classroom settings and teachers may be provided with structured orientation to ensure consistent and effective delivery of SUMBACC across various classrooms.*

Keywords— *SUMBACC, Mathematical Proficiency, Cultural Awareness, Supplemental Material, Community-Centric.*

I. INTRODUCTION

Mathematics is crucial in equipping students with problem-solving abilities, logical reasoning, and sound decision-making skills. However, in the Philippines, many students struggle to master fundamental arithmetic, essential for their overall academic development. The Department of Education (DepEd) has reported that many Filipino students perform below the expected proficiency levels in mathematics. National assessments reveal that only 31.4% of Grade 7 students meet the required standards (DepEd, 2019).

Integrating cultural elements into mathematics instruction can enhance student engagement and understanding. Agup and Agup (2020) demonstrated that incorporating Ilokano cultural practices into mathematics lessons not made learning more meaningful and reinforced students' connection to their heritage. Similarly, Casinillo et al. (2020) found that acknowledging the cultural backgrounds of Badjao students positively impacted their beliefs and practices related to mathematics learning.

Despite these insights, there remains a shortage of instructional materials that effectively blend basic arithmetic with culturally relevant content tailored to specific communities. This gap focuses on the need for resources that address mathematical proficiency and promote cultural awareness. The research, SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric): Enhancement of Cultural Awareness and Mathematical Proficiency of Grade 7, seeks to fill that gap by using the rich cultural heritage of Pagsanjan, Laguna, as a framework for improving basic arithmetic skills. Through contextualized activities and lessons linked to the community's tradition, SUMBACC aims to strengthen students' understanding of arithmetic operations while nurturing their cultural awareness.

The study aims to evaluate the SUMBACC's effectiveness in enhancing cultural awareness and mathematical proficiency. The findings are expected to contribute valuable insights into designing and implementing culturally grounded educational materials, supporting academic success and cultural preservation.

1.1 Statement of the Problem

Ma Jane Andaya Antonio, "Sumbacc (Supplemental Material in Basic Arithmetic in Community - Centric): Enhancement of Cultural Awareness and Mathematical Proficiency of Grade 7," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 719-732, 2025.

Problem/s which were addressed by the research

This study aims to evaluate the acceptability of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in enhancing cultural awareness and basic mathematical proficiency among Grade 7. Specifically, it sought answers to the following questions.

1. What is the level of the SUMBACC (Supplemental Material in Basic Arithmetic in Community - Centric) in terms of components as perceived by Grade 7 with regards to:
   1.1. Setting Sail;
   1.2. Navigating the Rapids;
   1.3. Rowing Through Discovery;
   1.4. Checking the Flow; and
   1.5. Completing the Ride?
2. What is the level of the SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of characteristics as perceived by Grade 7 with regards to:
   2.1. Content Relevance;
   2.2. Sequential Structure;
   2.3. Interactivity; and
   2.4. Visual Integration?
3. What is the level of the cultural awareness of Grade 7 in terms of:
   3.1. Recognition;
   3.2. Respect;
   3.3. Empathy;
   3.4. Knowledge Acquisition; and
   3.5. Self-Reflection?
4. What is the level of the mathematical proficiency of Grade 7 in terms of:
   4.1. Conceptual Understanding;
   4.2. Procedural Fluency;
   4.3. Strategic Competence;
   4.4. Adaptive Reasoning; and
   4.5. Productive Disposition?
5. Is there a significant relationship between the SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) and the cultural awareness?
6. Is there a significant effect between the SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) on the mathematical proficiency?

II. Methodology

The study employed the descriptive quantitative design to examine the characteristics of the population without manipulating variables. It gathered quantifiable data to identify patterns, relationships, and trends, measuring the cultural awareness of Grade 7 students. Purposive Sampling was used to select 93 respondents from Jasmine and Daisy at Pagsanjan Integrated National High School, who participated in the survey and assessment for Academic Year 2024–2025.

III. Results and Discussion

This part comprehensively discusses the collected data and its analysis and interpretation. The data is systematically arranged using tables, graphs, and descriptive narratives to ensure clarity and coherence. Through careful examination, patterns, trends, and relationships are identified to address the research objectives. The interpretation of findings offers meaningful insights that serve as the foundation for the study's conclusions and recommendations.

Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) as to Components

The SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) is evaluated in terms of its constituent parts: setting sail, navigating the rapids, rowing through discovery, checking the flow, and finishing the journey.

The following table shows the statement, mean, standard deviation, remarks and verbal interpretation.

Table 1 presents the level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of its components as perceived by Grade 7 regarding setting sail.

The level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of the component as perceived by Grade 7 with regard to setting sail yielded a computed weighted mean of (4.11), with a standard deviation of (0.70) and remarked as Acceptable. Among the five statements, the highest mean score was obtained by the item stating that "The SUMBACC illustrates learning goals that can be measured and achieved" (M=4.29, SD=0.65), remarked as Strongly Agree, affirming that the objectives of the supplementary material are clearly defined and attainable. The remaining statements received mean scores ranging from 4.00 to 4.14, all remarked as Agree, while the relatively low standard deviations, ranging from 0.65 to 0.74, indicate consistency in Grade 7 students' perception.

TABLE 1. Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of Components as perceived by Grade 7 with regards to Setting Sail

Statement The SUMBACC …	Mean	SD	Remarks
…outlines what students are expected to learn.	4.00	0.74	Agree
…associates its learning goals with the Grade 7 Math curriculum.	4.11	0.68	Agree
…demonstrates clear goals in each lesson so students know what to learn.	4.14	0.69	Agree
…illustrates learning goals that can be measured and achieved.	4.29	0.65	Strongly Agree
…presents goals that focus on both understanding math and improving problem-solving skills.	4.00	0.74	Agree
Weighted Mean		4.11	
SD		0.70	
Verbal Interpretation		Acceptable	

Overall, this implies that setting sail as a component of SUMBACC is well-structured and aligned with the needs of Grade 7 learners, making it a reliable element of the SUMBACC. Teachers are likely to adopt the proposed supplemental material, incorporating it into their teaching and learning activities. Well-defined learning objectives play a significant role in having a clear learning purpose, serving as a

Ma Jane Andaya Antonio, "Sumbacc (Supplemental Material in Basic Arithmetic in Community - Centric): Enhancement of Cultural Awareness and Mathematical Proficiency of Grade 7," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 719-732, 2025.

guiding element that provides direction and structure to the learning process.

According to James (2020), well-defined learning objectives can enhance the effectiveness of information literacy instruction. It emphasizes the need for clear and measurable learning objectives to guide student learning and assessment.

Similarly, Mitchell & Manzo (2018), highlighted that learning objectives serve multiple purposes, such as guiding instruction and assessing student progress.

Table 2 presents the level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric in terms of components as perceived by Grade 7 regarding navigating the rapids.

TABLE 2. Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of Components as perceived by Grade 7 with regards to Navigating the Rapids

Statement The SUMBACC …	Mean	SD	Remarks
…identifies useful examples to help students understand basic ideas.	4.09	0.78	Agree
...explains basic ideas in a clear and easy-to-understand way.	4.23	0.77	Strongly Agree
…demonstrate the basic ideas of algebra.	4.22	0.78	Strongly Agree
…associates basic ideas with other math topics.	4.23	0.75	Strongly Agree
…evaluate basic ideas to help students remember them.	4.01	0.81	Agree
Weighted Mean	4.15		
SD	0.78		
Verbal Interpretation	Acceptable		

The computed weighted mean of (4.15), with a standard deviation of (0.78), was considered Acceptable. The highest mean scores were achieved in the following items, "explains basic ideas in a clear and easy-to-understand way" (M=4.23, SD=0.77), "demonstrates the basic ideas of algebra" (M=4.22, SD=0.78), and "associates basic ideas with other math topics" (M=4.23, SD=0.75), all were remarked as Strongly Agree. The item "evaluates basic ideas to help students remember them" received the lowest mean score (M=4.01, SD=0.81), remarked as Agree.

It implies that the material is well-structured and beneficial in guiding Grade 7 through basic arithmetic concepts. It indicates a good level of agreement among Grade 7, showing effectiveness in presenting core concepts in an accessible and coherent manner, with room to strengthen students' retention.

According to Hambrock et al. (2020), core learning concepts are essential for ensuring seamless transitions between different learning environments and helping students integrate and apply knowledge more effectively. In addition, in integrating core concepts into learning materials for young children, Peralta (2023) highlighted that core concepts enhance the foundational understanding and skill development of the children.

Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of Components as perceived by Grade 7 with regards to Rowing Through Discovery

Table 3 presents the level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of “components” as perceived by Grade 7 regarding “rowing through discovery”.

TABLE 3. Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of Components as perceived by Grade 7 with regards to Rowing Through Discovery

Statement The SUMBACC …	Mean	SD	Remarks
…outlines activities to help students understand Algebraic Expressions.	4.35	0.79	Strongly Agree
…presents different hands-on activities for learning.	4.39	0.75	Strongly Agree
…operates students to work together in every hands-on activity.	4.26	0.72	Strongly Agree
…organizes both individual and group hands-on activities to suit different learning styles.	4.45	0.71	Strongly Agree
…evaluate hands-on activities to students' everyday lives.	4.37	0.76	Strongly Agree
Weighted Mean	4.36		
SD	0.75		
Verbal Interpretation	Highly Acceptable		

The computed weighted mean of (4.36), with a standard deviation of (0.75), was remarked as Highly Acceptable. The item "organizes both individual and group hands-on activities to suit different learning styles" received a mean score of 4.45 (SD=0.71), remarked as Strongly Agree. Closely followed by the items "presents different hands-on activities for learning' (M=4.39, SD=0.75) and "evaluates hands-on activities to students' everyday lives" (M=4.37, SD=0.76), both remarked as Strongly Agree. The item “outlines activities to help students understand Algebraic Expressions” scored M = 4.35 (SD = 0.79) and was rated as Strongly Agree. The item “operates students to work together in every hands-on activity” received the lowest mean score (M=4.26, SD=0.72).

The results indicate that the hands-on activities provided in the supplementary material are well-organized and engaging. Overall, this implies that the material is well-received and consistently beneficial, showing that SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) is highly effective in using diverse, interactive approaches to help students understand algebraic expressions and apply them to real-life scenarios.

Oppong Frimpong (2020) states that play-based learning enhances cognitive, social, and literacy development in young learners, making early education more effective. Similarly, Piro (2016) demonstrated that hands-on exploration enhances students' ability to grasp and retain complex ideas.

Table 4 presents the level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of components as perceived by Grade 7 regarding “checking the flow”. The table shows the statement, mean, standard deviation, remark, and verbal interpretation.

The computed weighted mean of (4.20), with a standard deviation of (0.73), was remarked as Acceptable. The highest mean score of 4.30 (SD=0.69) was recorded for the item "utilizes both regular tests and practical assessments," remarked as Strongly Agree. The item "provides chances for students to assess themselves and each other" scored M = 4.19

(SD = 0.73), remarked as Agree. The item "provides chances for students to assess themselves and each other" has the lowest mean score (M=4.19, SD=0.73).

TABLE 4. Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of Components as perceived by Grade 7 with regards to Checking the Flow

Statement The SUMBACC …	Mean	SD	Remarks
…aligns assessment tools with the learning goals.	4.10	0.77	Agree
…assures that evaluation activities are easy to understand and score.	4.20	0.73	Agree
…employs quizzes and activities to check understanding while learning.	4.18	0.75	Agree
…utilizes both regular tests and practical assessments.	4.30	0.69	Strongly Agree
…provides chances for students to assess themselves and each other.	4.19	0.73	Agree
Weighted Mean	4.20		
SD	0.73		
Verbal Interpretation	Acceptable		

This implies that checking the flow is a well-structured and effective component that meets the expected standards based on respondent feedback. It offers a well-balanced approach to assessment, effectively aligning with its learning goals and providing multiple opportunities for evaluation.

Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of Components as perceived by Grade 7 with regards to Completing the Ride

Table 5 presents the level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of components as perceived by Grade 7 regarding "completing the ride".

TABLE 5. Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of Components as perceived by Grade 7 with regards to Completing the Ride

Statement The SUMBACC …	Mean	SD	Remarks
…illustrates the importance of summarizing the key ideas and what students should have learned.	4.23	0.80	Strongly Agree
…explains how different topics are connected in the summaries.	4.22	0.75	Strongly Agree
…constructs structured conclusions and summaries at the end of each topic.	4.26	0.75	Strongly Agree
…describes a preview of upcoming lessons in each conclusion.	4.16	0.76	Agree
…integrates reflection prompts in the conclusion sections to encourage students to think about their learning.	4.15	0.78	Agree
Weighted Mean	4.20		
SD	0.77		
Verbal Interpretation	Highly Acceptable		

The computed weighted mean of (4.20), with a standard deviation of (0.77), was remarked as Highly Acceptable. The highest-rated item was "constructs structured conclusions and summaries at the end of each topic," with a mean score of 4.26 (SD = 0.75), remarked as Strongly Agree. The items "illustrate the importance of summarizing the key ideas and what students should have learned" (M = 4.23, SD = 0.80) and "explain how different topics are connected in the summaries" (M = 4.22, SD = 0.75) also received Strongly Agree ratings. The items "describes a preview of upcoming lessons in each conclusion" (M = 4.16, SD = 0.76) and "integrates reflection prompts in the conclusion sections to encourage students to think about their learning" (M = 4.15, SD = 0.78) were both rated as Agree.

Overall, it implies that "completing the ride" is well-received and deemed effective in its intended purpose. Its high acceptability indicates that it aligns with learners' needs, making it a valuable instructional tool and providing clear, structured conclusions and summaries, which effectively reinforce learning and encourage reflection, making it a highly effective instructional tool.

According to Tomlinson (2023), conclusions in learning materials help reinforce the main points covered and provide a sense of closure, aiding in summarizing the key takeaways and ensuring that learners retain the most important information.

Moreover, Graves (2016) highlighted that conclusions help learners review and internalize the material. Both confirm the critical role of conclusion in learning materials as tools for reinforcement and retention.

Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) as to Characteristics

The level of the SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of characteristics as perceived by Grade 7 with regard to content relevance, sequential structure, interactivity, and visual integration. The following table shows the statement, mean, standard deviation, remarks and verbal interpretation.

Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in Terms of Characteristics as perceived by Grade 7 with regards to Content Relevance

Table 6 presents the level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric in terms of Characteristics as perceived by Grade 7 with regard to content relevance.

TABLE 6. Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in Terms of Characteristics as perceived by Grade 7 with regards to Content Relevance

Statement The SUMBACC …	Mean	SD	Remarks
…recognizes the essential mathematics topics that Grade 7 students need to learn.	4.06	0.69	Agree
…understands the importance of mathematics by providing real-life examples.	4.13	0.73	Agree
…applies differentiated instruction to align lessons with each student's learning level.	4.09	0.75	Agree
…analyzes problems and activities that develop foundational algebraic skills.	4.20	0.73	Agree
…assembles modern examples and scenarios to help students see how what they learn applies to real life.	3.96	0.75	Agree
Weighted Mean	4.09		
SD	0.73		
Verbal Interpretation	Acceptable		

Content Relevance as a characteristic yielded a computed weighted mean of (4.09), with a standard deviation of (0.73), and was remarked as Acceptable. The highest mean score, 4.20 (SD = 0.73), was recorded for the item "analyzes problems and activities that develop foundational algebraic

skills," remarked as Agree. The items "understands the importance of mathematics by providing real-life examples" (M = 4.13, SD = 0.73) and "applies differentiated instruction to align lessons with each student's learning level" (M = 4.09, SD = 0.75) were also rated as Agree. The item "recognizes the essential mathematics topics that Grade 7 students need to learn" scored M = 4.06 (SD = 0.69), remarked as Agree. The lowest mean score of M = 3.96 (SD = 0.75) was given to the item "assembles modern examples and scenarios to help students see how what they learn applies to real life", was rated also as Agree. With standard deviations ranging from 0.69 to 0.75, the responses demonstrate a moderate level of consistency in the students' evaluations.

Overall, it implies that "content relevance" is well-received and considered effective in its intended purpose. It indicates that it meets expectations in terms of recognizing essential topics, using real-life examples, and applying differentiated instruction.

According to Sexton (2017), the higher perceived relevance of instructional content led to better academic performance and cognitive learning.

In addition, Ochoma (2020) highlighted the importance of making curriculum content relevant to the needs of 21st-century learners, recommending that education stakeholders adapt to changes and ensure that what learners learn is useful in their day-to-day activities.

Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in Terms of Characteristics as perceived by Grade 7 with regards to Sequential Structure

Table 7 presents the level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of characteristics as perceived by Grade 7 with regard to sequential structure.

TABLE 7. Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in Terms of Characteristics as perceived by Grade 7 with regards to Sequential Structure

Statement The SUMBACC …	Mean	SD	Remarks
…outlines tasks so students start with easy topics before moving to harder ones.	4.13	0.77	Agree
…organizes topics in a clear and easy-to-follow order.	4.18	0.74	Agree
…employs activities that help students learn Algebraic Expressions step by step.	4.17	0.75	Agree
…makes sure students move smoothly from one topic to the next without feeling stressed.	4.18	0.71	Agree
…creates lessons that let students learn at their own pace, so they feel comfortable.	4.26	0.79	Agree
Weighted Mean		4.18	
SD		0.75	
Verbal Interpretation		Acceptable	

The level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of Characteristics as perceived by Grade 7 with regard to Sequential Structure yielded an overall weighted mean of (4.18), with a standard deviation of (0.75), and remarked as Acceptable.

The highest mean score of 4.26 (SD = 0.79) was recorded for the item "creates lessons that let students learn at their own pace, so they feel comfortable," remarked as Agree. The other items received mean scores ranging from 4.13 to 4.18, all marked as Agree, as the item "outlines tasks so students start with easy topics before moving to harder ones" received the lowest mean score (M=4.13, SD=0.77) among the five statements. The standard deviations, ranging from 0.71 to 0.79, show moderate response consistency. The results demonstrate positive evaluations of how SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) outlines tasks, organizes topics, and employs step-by-step activities to help students learn algebraic expressions. It indicates that the supplementary material successfully structures lessons in a clear, logical sequence, starting with easier topics before moving to more difficult ones and ensuring smooth transitions between topics.

In general, the result affirms that sequential structure is considered acceptable. It reveals that SUMBACC effectively supports students in their learning progression with a clear, manageable structure that helps them build their skills gradually and comfortably.

According to Lin and Hsu (2021), learning materials that incorporate sequential structuring can help learners process and retain information more effectively. Moreover, Valle Torre (2024) concluded that the order of learning activities significantly affects educational outcomes. Learning activities designed sequentially foster deeper understanding by allowing gradual cognitive development.

Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of Characteristics as perceived by Grade 7 with regards to Interactivity

Table 8 presents the level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of characteristics as perceived by Grade 7 regarding interactivity.

The computed weighted average of the Grade 7's perceived features of SUMBACC regarding interactivity was found to be (4.10), with a standard deviation of (0.81), which was deemed acceptable. The highest mean scores were achieved for the items "presents fun activities like simulations and problem-solving tasks" and "permits students to choose their learning path," both scoring M = 4.13 (SD = 0.78 and 0.81, respectively), remarked as Agree. The item "facilitates students to work together and share their answers" scored M = 4.11 (SD = 0.77) and was rated as Agree. The item "utilizes fun tasks like puzzles and hands-on activities" received a mean score of M = 4.06 (SD = 0.79), and "assists students to think about their learning by giving them tools to check their understanding" scored M = 4.09 (SD = 0.88), both remarked as Agree. The result shows that while SUMBACC incorporates various fun tasks and reflective tools, there is slight room for improvement in the clarity or frequency of these activities to enhance student engagement further. With standard deviations ranging from 0.77 to 0.88, the responses exhibit a moderate level of consistency, with some slight variation in how strongly respondents agree.

TABLE 8. Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in terms of Characteristics as perceived by Grade 7 with regards to Interactivity

Statement The SUMBACC …	Mean	SD	Remarks
…utilizes fun tasks like puzzles and hands-on activities.	4.06	0.79	Agree
…presents fun activities like simulations and problem-solving tasks.	4.13	0.78	Agree
…facilitates students to work together and share their answers.	4.11	0.77	Agree
…assists students think about their learning by giving them tools to check their understanding.	4.09	0.88	Agree
…permits students choose their own learning path.	4.13	0.81	Agree
Weighted Mean	4.10		
SD	0.81		
Verbal Interpretation	Acceptable		

The results implied that interactivity is generally well-received, indicating that SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) is successful in offering fun, interactive tasks and promoting student autonomy and collaboration. However, there is potential to strengthen reflection tools and task variety further.

Kobayashi (2019) argues that interactivity and interaction are essential components of improving learning by getting ready to teach and actually teaching. It shows that interactive teaching methods, such as asking and answering questions, can significantly improve learning outcomes.

Similarly, regarding the effectiveness of interactive learning, Abykanova et al. (2016) concluded that integrating interactive learning systems with traditional ones can improve the overall structure of the learning process and boost student progress.

Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in Terms of Characteristics as perceived by Grade 7 with regards to Visual Integration

Table 9 presents the level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric in terms of Characteristics as perceived by Grade 7 with regard to Visual Integration.

TABLE 9. Level of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) in Terms of Characteristics as perceived by Grade 7 with regards to Visual Integration

Statement The SUMBACC …	Mean	SD	Remarks
…presents visual organizers to help students follow the steps.	4.28	0.76	Strongly Agree
…utilizes visual aids to explain difficult ideas, making them easier to understand.	4.20	0.72	Agree
…presents math relationships clearly with graphs, charts, and diagrams.	4.12	0.75	Agree
…arranges its design and visuals to help students focus and understand better.	4.19	0.66	Agree
…integrates engaging visuals like illustrations and models.	4.14	0.84	Agree
Weighted Mean	4.19		
SD	0.75		
Verbal Interpretation	Acceptable		

The level of SUMBACC in terms of characteristics with regard to visual integration yielded a computed weighted mean of (4.19), with a standard deviation of (0.75), and was remarked as Acceptable. The highest mean score of 4.28 (SD = 0.76) was recorded for the item "presents visual organizers to help students follow the steps," remarked as Strongly Agree. The items "utilizes visual aids to explain difficult ideas, making them easier to understand" (M = 4.20, SD = 0.72) and “arranges its design and visuals to help students focus and understand better” (M = 4.19, SD = 0.66), were also rated as Agree.

The results implied that visual integration is generally well-received. The results reveal that SUMBACC effectively uses visual aids and organizers to enhance student understanding. Still, there is potential for further improvement in the integration and clarity of some visual elements.

According to Raiyn (2016), a visual learning environment based on information and communication technology can enhance students' higher-order thinking skills. The findings suggest visual learning tools promote deeper cognitive processing and problem-solving abilities. In a similar vein, Mason et al. (2015) investigated how combining textual and graphical material during rereading influences learning from illustrated books. The study uses eye-movement tracking to show that effective visual integration enhances comprehension and retention.

Level of Cultural Awareness of Grade 7

The level of Grade 7's cultural awareness in terms of recognition, respect, empathy, knowledge acquisition, and self-reflection.

The following table shows statements, mean scores, standard deviations, remarks, and verbal interpretation.

Table 10 presents the level of cultural awareness as perceived by grade 7 in terms of recognition. The table shows the statement, mean, standard deviation, remarks and verbal interpretation.

TABLE 10. Level of Cultural Awareness of Grade 7 in terms of Recognition

Statement The learner …	Mean	SD	Remarks
…identifies the traditions and practices unique to the Pagsanjan community.	4.28	0.77	Strongly Agree
…recognizes the significance of Pagsanjan Falls as a key symbol of cultural identity.	4.34	0.73	Strongly Agree
…acknowledges the role of bangkeros in preserving the town’s cultural heritage.	4.29	0.77	Strongly Agree
…recognizes how local products and crafts contribute to Pagsanjan’s cultural value.	4.61	0.57	Strongly Agree
…is aware of the historical importance of Pagsanjan's community events and celebrations.	4.08	0.76	Agree
Weighted Mean	4.32		
SD	0.76		
Verbal Interpretation	Highly Aware		

The indicator recognition received a computed weighted mean of (4.32), with a standard deviation of (0.76), and remarked as Highly Aware.

The highest mean score of 4.61 (SD = 0.57) was recorded for the item "recognizes how local products and crafts contribute to Pagsanjan's cultural value," remarked as Strongly Agree. Other items, such as "recognizes the significance of

Pagsanjan Falls as a key symbol of cultural identity" (M = 4.34, SD = 0.73) and "acknowledges the role of bangkeros in preserving the town's cultural heritage" (M = 4.29, SD = 0.77), also received Strongly Agree. The item "identifies the traditions and practices unique to the Pagsanjan community" scored M = 4.28 (SD = 0.77), remarked as Strongly Agree. The item "is aware of the historical importance of Pagsanjan's community events and celebrations" received the lowest mean score (M = 4.08, SD = 0.76), remarked as Agree.

Overall, the results implied that recognition successfully fosters awareness among Grade 7 students, indicating that students demonstrate a high level of awareness of the cultural and historical elements of the Pagsanjan community. It indicate that utilizing local context into learning materials can enhance students' connection to the community.

Supported by Govere & Govere (2016), recognition is central to cultural competence education, as it involves acknowledging differences in cultural perspectives and developing the skills to adapt accordingly.

Moreover, Lee & Park (2020) explored that recognizing and valuing diverse cultural perspectives is identified as a key factor in ethical practice. It involves acknowledging cultural differences and valuing and adapting to them, which is essential for promoting inclusive and respectful learning environments.

Table 11 presents level of cultural awareness of Grade 7 in terms of respect.

TABLE 11. Level of Cultural Awareness of Grade 7 in terms of Respect

Statement The learner …	Mean	SD	Remarks
…recalls showing respect by observing proper behavior during Pagsanjan town celebrations.	4.30	0.78	Strongly Agree
…recognizes the need to preserve the town's historical and cultural heritage for future generations.	4.33	0.80	Strongly Agree
…treats Pagsanjan locals and community leaders with courtesy and consideration.	4.39	0.78	Strongly Agree
…demonstrates respect to the customs and practices unique to the Pagsanjan community.	4.32	0.75	Strongly Agree
…appreciates the contributions of different sectors, including boatmen, farmers, and small business owners.	4.09	0.80	Agree
Weighted Mean	4.29		
SD	0.78		
Verbal Interpretation	Highly Aware		

The indicator "respect" yielded a computed weighted mean (4.29), with a standard deviation of (0.78), and remarked as Highly Aware. The highest mean score of 4.39 (SD = 0.78) was obtained for the item "treats Pagsanjan locals and community leaders with courtesy and consideration," remarked as Strongly Agree. Similarly, the items "recognize the need to preserve the town's historical and cultural heritage for future generations" (M = 4.33, SD = 0.80) and "demonstrate respect to the customs and practices unique to the Pagsanjan community" (M = 4.32, SD = 0.75), remarked as Strongly Agree. The item "recalls showing respect by observing proper behavior during Pagsanjan town celebrations" scored M = 4.30 (SD = 0.78), and it was also remarked as Strongly Agree. While the item "appreciates the contributions of different sectors, including boatmen, farmers, and small business owners" had the lowest mean at 4.09 (SD = 0.80) and rated as Agree, demonstrated a slightly lower but still present recognition of the roles of various community members in local development.

Overall, the results implied that respect successfully fosters awareness among respondents. It reveals that students have developed a strong sense of cultural respect and awareness, particularly in upholding traditions, honoring community members, and preserving the town's heritage.

According to Durden et al. (2016), respect is a critical skill for individuals and organizations aiming to develop cultural competence, as it promotes mutual understanding and reduces conflict in diverse settings. Moreover, respect for different cultures is a crucial employability skill. It allows individuals to navigate globalized workplaces effectively and collaborate with diverse teams (Ripmeester & Deardorff, 2021). It supports the idea that respect is vital to cultural competence that fosters mutual understanding and effective collaboration in diverse environments. It reduces conflict and equips individuals with the key employability skills necessary for thriving in multicultural and globalized settings.

Level of Cultural Awareness of Grade 7 in terms of Empathy

Table 12 presents Grade 7's level of cultural awareness in terms of empathy. It shows the statement, mean, standard deviation, remark, and verbal interpretation.

TABLE 12. Level of Cultural Awareness of Grade 7 in terms of Empathy

Statement The learner …	Mean	SD	Remarks
…understands how tourism impacts the everyday lives of locals.	4.09	0.84	Agree
…can explain how the bangkeros' hard work contributes to Pagsanjan's cultural life.	4.12	0.83	Agree
…empathizes with the physical challenges faced by Pagsanjan's bangkeros.	4.09	0.80	Agree
…seeks to understand the views of locals on how tourism impacts their daily lives.	4.25	0.69	Strongly Agree
…empathizes with small business owners who strive to preserve local culture through their products.	4.05	0.84	Agree
Weighted Mean	4.12		
SD	0.80		
Verbal Interpretation	Aware		

The indicator "empathy" yielded a computed weighted mean of (4.12), with a standard deviation of (0.76), and remarked as Aware, indicating that Grade 7 are aware of the socio-cultural dynamics involved in local tourism. The item "seeks to understand the views of locals on how tourism impacts their daily lives" received the highest mean score of 4.25 (SD = 0.69) and was rated Strongly Agree. It implies that learners actively engage with local perspectives and show sensitivity to how tourism affects residents' day-to-day experiences. Other items such as "can explain how the bangkeros' hard work contributes to Pagsanjan's cultural life" (M = 4.12, SD = 0.83) and "understands how tourism impacts the everyday lives of locals" (M = 4.09, SD = 0.84) were rated Agree, reflecting an overall positive awareness of the value of

Ma Jane Andaya Antonio, "Sumbacc (Supplemental Material in Basic Arithmetic in Community - Centric): Enhancement of Cultural Awareness and Mathematical Proficiency of Grade 7," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 719-732, 2025.

community roles and tourism's social implications. Also, the item "empathizes with the physical challenges faced by Pagsanjan's bankeros" (M = 4.09, SD = 0.80), remarked as Agree. The item "empathizes with small business owners who strive to preserve local culture through their products" received the lowest means (M = 4.05, SD = 0.84) and remarked as Agree. It indicates emotional understanding toward community members' physical and economic efforts in maintaining cultural identity. The standard deviations, ranging from 0.69 to 0.84, suggest moderate response variation.

The results show that learners are generally aware of and empathetic towards the challenges faced and contributions of Pagsanjan locals in the context of tourism and cultural preservation. It demonstrated meaningful connection between the students and their community.

According to Dodge (2016), cultural empathy is understanding and communicating another person's thoughts and feelings within their cultural context. Teaching cultural empathy can improve outcomes in intercultural settings. In addition, Acott (2018) explored the development of empathy in multicultural classrooms, highlighting the importance of empathetic skills for teachers and students. It discusses how diverse educational settings provide unique opportunities for fostering empathy, essential for positive interactions among individuals from various backgrounds.

Level of Cultural Awareness of Grade 7 in terms of Knowledge Acquisition

Table 13 presents Grade 7's level of cultural awareness in terms of Knowledge Acquisition. It shows the statement, mean, standard deviation, remark, and verbal interpretation.

TABLE 13. Level of Cultural Awareness of Grade 7 in terms of Knowledge Acquisition

Statement The learner …	Mean	SD	Remarks
…remembers learning about the history and significance of Pagsanjan Falls.	4.55	0.71	Strongly Agree
…understands the cultural significance of traditional roles in Pagsanjan's tourism.	4.48	0.77	Strongly Agree
…enjoys discovering facts about the local landmarks and historical sites in Pagsanjan.	4.37	0.64	Strongly Agree
…analyzes how traditional crafts reflect the cultural identity of Pagsanjan.	4.39	0.74	Strongly Agree
…seeks to understand the connection between Pagsanjan's history and its present practices.	4.40	0.52	Strongly Agree
Weighted Mean	4.38		
SD	0.69		
Verbal Interpretation	Highly Aware		

The level of cultural awareness of grade 7 in terms of "knowledge acquisition" received a computed weighted mean of (4.38), with a standard deviation of (0.69), and was remarked as Highly Aware, indicating that Grade 7 is highly aware of the town's historical and cultural significance. The item "remembers learning about the history and significance of Pagsanjan Falls" received the highest mean score of 4.55 (SD = 0.71), remarked as Strongly Agree. The item showed that learners strongly value Pagsanjan Falls as a prominent cultural and historical landmark. Similarly, a strong agreement was observed in "understands the cultural significance of traditional roles in Pagsanjan's tourism" (M = 4.48, SD = 0.77) and "seeks to understand the connection between Pagsanjan's history and its present practices" (M = 4.40, SD = 0.52). The following items demonstrate deep learner engagement with historical knowledge and its relevance to community life. The items "analyzing how traditional crafts reflect the cultural identity of Pagsanjan" (M = 4.39, SD = 0.74) and "enjoying the discovery of facts about local landmarks and historical sites" (M = 4.37, SD = 0.64) and remarked as Strongly Agree. It implies that learning activities effectively encourage curiosity and connection to local heritage. The relatively low standard deviations imply consistency in learners' responses.

Overall, the results implied that "knowledge acquisition" is highly effective in promoting awareness, with strong consensus among respondents. It concluded that awareness translates into meaningful applications. Expanding its application through interactive discussions, real-life examples, or practical exercises could maximize its long-term impact and ensure sustained awareness among learners.

Egbokwu (2024) showed that an organization's culture directly impacts knowledge acquisition and application, particularly in professional environments where shared values, communication norms, and social interactions shape learning. These findings emphasize acknowledging individual and organizational cultural contexts to support effective learning and knowledge transfer.

Table 14 presents Grade 7's level of cultural awareness in terms of "self-reflection".

It shows the statement, mean, standard deviation, remark, and verbal interpretation.

TABLE 14. Level of Cultural Awareness of Grade 7 in terms of Self-Reflection

Statement The learner …	Mean	SD	Remarks
…recalls instances where he questioned its assumptions about Pagsanjan's culture.	4.40	0.75	Strongly Agree
…can explain how reflecting on his experiences helped me appreciate its rich culture.	4.20	0.76	Agree
…reflects on how Pagsanjan shaped its understanding of community values.	4.22	0.85	Strongly Agree
…identifies areas of personal growth after interactions in Pagsanjan.	4.26	0.74	Strongly Agree
…reflects on how experiences in Pagsanjan can shape understanding of other communities.	4.19	0.77	Agree
Weighted Mean	4.25		
SD	0.77		
Verbal Interpretation	Highly Aware		

The indicator "self-reflection" yielded a computed weighted mean of (4.25), with a standard deviation of (0.77), and remarked as Highly Aware, indicating that respondents demonstrate a high level of self-awareness and reflection about their cultural experiences in Pagsanjan. The item "recalls instances where he questioned its assumptions about Pagsanjan's culture" received the highest mean of 4.40 (SD = 0.75), remarked as Strongly Agree. The item indicates that learners engaged in critical thinking and challenged preconceived notions about the local culture. Similarly, strong

Ma Jane Andaya Antonio, "Sumbacc (Supplemental Material in Basic Arithmetic in Community - Centric): Enhancement of Cultural Awareness and Mathematical Proficiency of Grade 7," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 719-732, 2025.

levels of agreement were observed in "identifies areas of personal growth after interactions in Pagsanjan" (M = 4.26, SD = 0.74) and "reflects on how Pagsanjan shaped its understanding of community values" (M = 4.22, SD = 0.85), remarked as Strongly Agree. The item shows that learners are aware and able to internalize and grow from their cultural experiences. Other statements such as "can explain how reflecting on his experiences helped me appreciate its rich culture" (M = 4.20, SD = 0.76) and "reflects on how experiences in Pagsanjan can shape understanding of other communities" (M = 4.19, SD = 0.77) received Agree remarks. The items demonstrate that while reflective understanding is present, it can vary based on individual experiences or depth of engagement.

The results imply that "self-reflection" is successful in promoting a high level of awareness among Grade 7 students. The data reflects that Pagsanjan's instructional material and learning encounters fostered thoughtful reflection and meaningful insights, contributing to learners' personal and cultural development.

According to Moore (2018), self-reflection helps individuals think more deeply about their experiences and beliefs, which leads to better and more culturally sensitive decisions. It allows people to understand how their views may affect others. Similarly, Topping (2015) found that self-reflection can improve teamwork by helping professionals understand and respect different cultural backgrounds. By reflecting on their actions and attitudes, individuals can work better with others and build stronger, more respectful relationships.

Level of Mathematical Proficiency of Grade 7

The level of mathematical proficiency of Grade 7 in terms of conceptual understanding, procedural fluency, strategic competence, adaptive reasoning and productive disposition was treated statistically using the frequency and relative frequency.

The following table shows the statement, mean, standard deviation, remark, and verbal interpretation.

Table 15 presents Grade 7's mathematical proficiency level in terms of "conceptual understanding".

TABLE 15. Level of Mathematical Proficiency of Grade 7 in terms of Conceptual Understanding

Mathematical Proficiency	*f*	%	Remarks
90 – 100	16	17.20	Outstanding
85 – 89	5	5.38	Above Average
80 – 84	0	0	Average
75 – 79	8	8.60	Below Average
Below 75	64	68.82	Needs Improvement
Mn			63.77
SD			2.64
Verbal Interpretation			Did Not Meet Expectations

The level of mathematical proficiency of Grade 7 in terms of " "understanding" reveals that a significant majority (68.82%) scored below 75, indicating a "Needs Improvement" level. Only 17.20% achieved an "Outstanding" performance, while smaller percentages fell into the "Above Average" (5.38%) and "Below Average" (8.60%) categories. In particular, no students scored within the "Average" range (80–84). The level of mathematical proficiency in terms of conceptual understanding yielded a computed mean score of 63.77 with a standard deviation of 2.64, which further supports the verbal interpretation of "Did Not Meet Expectations," affirming that most learners lack adequate conceptual understanding in mathematics and may benefit from targeted instructional interventions.

The data indicate that many grade 7 students exhibit low conceptual understanding of mathematics. The verbal interpretation shows that it is below the expected proficiency level, as it did not meet expectations, confirming the urgent need for intervention programs to strengthen students' conceptual understanding and improve mathematical proficiency.

Edulsa (2022) found that a strong conceptual understanding of mathematics leads to better academic performance, while a lack of it results in poor performance. The study suggests bridging programs to improve math comprehension, especially for STEM students. Similarly, Putri et al. (2022) mentioned students' challenges and successes in applying conceptual understanding to solve math problems, emphasizing its importance for problem-solving and knowledge development. It confirms that conceptual understanding is essential for academic success and effective problem-solving in mathematics.

Level of Mathematical Proficiency of Grade 7 in terms of Procedural Fluency

Table 16 presents Grade 7's mathematical proficiency level in terms of procedural fluency.

The table includes proficiency levels, corresponding percentages, mean scores, standard deviations, and qualitative remarks.

TABLE 16. Level of Mathematical Proficiency of Grade 7 in terms of Procedural Fluency

Mathematical Proficiency	*f*	%	Remarks
90 – 100	36	38.71	Outstanding
85 – 89	0	0	Above Average
80 – 84	22	23.65	Average
75 – 79	15	16.13	Below Average
Below 75	20	21.51	Needs Improvement
Mn			81.90
SD			1.93
Verbal Interpretation			Satisfactory

The data shows that Grade 7 students generally have a satisfactory level of mathematical proficiency in procedural fluency, with a mean score of 81.90 and a standard deviation of 1.93. A large percentage (38.71%) achieved outstanding performance, while 23.65% performed at an average level. Meanwhile, 16.13% were classified as Below Average (75–79), and 21.51% fell under the Needs Improvement category (scores below 75). Notably, no students scored within the Above Average range (85–89).

In general, the results indicate that while many students demonstrate proficiency in mathematical procedures, a significant number still face challenges in achieving consistent mastery across concepts. It demonstrates the need for targeted and differentiated instructions to address individual learning gaps. Personalized support can help close these gaps, ensuring

Ma Jane Andaya Antonio, "Sumbacc (Supplemental Material in Basic Arithmetic in Community - Centric): Enhancement of Cultural Awareness and Mathematical Proficiency of Grade 7," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 719-732, 2025.

more equitable progress and a deeper understanding of mathematical concepts for all students. Schulz (2023) argues that procedural fluency in student teachers, particularly with natural and rational numbers, is crucial for fostering a deeper understanding of mathematics and developing effective teaching strategies.

Similarly, Andal & Andrade (2022) found that students with stronger procedural fluency can more easily adapt their reasoning and problem-solving methods, leading to greater success in mathematics. The studies signify that procedural fluency enhances mathematical understanding and performance.

Table 17 presents grade 7's mathematical proficiency level in terms of strategic competence. It includes proficiency levels, corresponding percentages, mean scores, standard deviations, and qualitative remarks.

TABLE 17. Level of Mathematical Proficiency of by Grade 7 in terms of Strategic Competence

Mathematical Proficiency	*f*	%	Remarks
90 – 100	37	39.78	Outstanding
85 – 89	0	0	Above Average
80 – 84	13	13.98	Average
75 – 79	0	0	Below Average
Below 75	43	46.24	Needs Improvement
Mn			77.85
SD			1.69
Verbal Interpretation			Fairly Satisfactory

The data on grade 7 students' strategic competence revealed a mean score of 77.85 (SD = 1.69), interpreted as Fairly Satisfactory. While 39.78% of students achieved an Outstanding rating, a larger proportion (46.24%) fell under the Needs Improvement category, indicating difficulties in applying effective problem-solving strategies. Only 13.98% were classified as Average, and notably, no students scored within the above-average or Below-average categories, reflecting a varied yet uneven distribution of performance levels.

The data reveals that while a few students are performing exceptionally well in mathematics, a significant portion still require improvement. This affirms the importance of targeted instructional support to strengthen students' strategic thinking and problem-solving skills in mathematics.

According to Hasto & Star (2023), strategic competence in university mathematics is closely associated with strategy flexibility, wherein students who can shift between different problem-solving approaches tend to exhibit higher levels of proficiency.

Moreover, Albalawi (2022) highlighted that strategic competence is enhanced through STEM-based learning, as students develop the ability to apply problem-solving strategies in real-world contexts by engaging in interdisciplinary mathematical tasks.

Table 18 presents the level of mathematical proficiency of grade 7 in terms of "adaptive reasoning". It includes proficiency levels, corresponding percentages, mean scores, standard deviations, and qualitative remarks.

TABLE 18. Level of Mathematical Proficiency of Grade 7 in terms of Adaptive Reasoning

Mathematical Proficiency	*f*	%	Remarks
90 – 100	5	5.38	Outstanding
85 – 89	9	9.67	Above Average
80 – 84	0	0	Average
75 – 79	20	21.51	Below Average
Below 75	59	63.44	Needs Improvement
Mn			57.53
SD			1.77
Verbal Interpretation			Did Not Meet Expectations

The data on "adaptive reasoning" among Grade 7 students showed a mean score of 57.53 (SD = 1.77), verbally interpreted as Did Not Meet Expectations. A majority (63.44%) fell under Needs Improvement, while 21.51% were Below Average. Only a few students demonstrated higher proficiency, with 9.67% Above Average and 5.38% Outstanding. Notably, no students were classified as Average.

The results indicate that the majority of Grade 7 students fall below the expected proficiency level. This implies a need for targeted intervention and support to address the gaps in learning and help students improve their mathematical skills.

According to Darwani et al. (2020), adaptive reasoning is crucial for students to develop effective problem-solving strategies and adapt their thinking to new situations. Additionally, Muin et al. (2018) emphasized the importance of adaptive reasoning in fostering students' capacity for creative thought and complex problem-solving.

Table 19 presents the level of mathematical proficiency of Grade 7 in terms of "productive disposition'.

TABLE 19. Level of Mathematical Proficiency of Grade 7 in terms of Productive Disposition

Mathematical Proficiency	*f*	%	Remarks
90 – 100	40	43.01	Outstanding
85 – 89	12	12.90	Above Average
80 – 84	0	0	Average
75 – 79	0	0	Below Average
Below 75	41	44.09	Needs Improvement
Mn			75.27
SD			2.06
Verbal Interpretation			Fairly Satisfactory

The data on "productive reasoning" among Grade 7 students revealed a mean score of 75.27 (SD = 2.06), remarked as Fairly Satisfactory. While 43.01% showed Outstanding performance, 12.90% were above average, and 44.09% fell under Needs Improvement. However, no students were classified as Average or Below Average.

The data revealed that Grade 7 students reflected a fairly satisfactory overall performance but also indicated considerable variation in student outcomes. It shows the necessity for targeted support and intervention strategies to help Grade 7 students improve their mathematical skills and bridge the proficiency gap.

According to Philipp & Siegfried (2015), a productive disposition is a crucial aspect of mathematical proficiency, emphasizing the importance of student's beliefs in their ability to engage with mathematics meaningfully. It highlights that fostering a positive mathematical identity can increase perseverance and problem-solving engagement. Similarly, Go

Ma Jane Andaya Antonio, "Sumbacc (Supplemental Material in Basic Arithmetic in Community - Centric): Enhancement of Cultural Awareness and Mathematical Proficiency of Grade 7," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 719-732, 2025.

& Lomibao (2024) explored learners' productive disposition towards learning mathematics through a phenomenological analysis. It confirms the importance of emotional responses, motivation, and resilience in developing a productive disposition towards mathematics.

Significant Relationship between SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) and Cultural Awareness

The significant relationship between SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) and cultural awareness—specifically in terms of recognition, respect, empathy, knowledge acquisition, and self-reflection—was analyzed statistically using Jamovi 2.3.28 and Pearson correlation coefficient.

Table 20 presents the results of the Pearson correlation analysis examining the relationship between the SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) and cultural awareness.

TABLE 20. Significant Relationship between the SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) and the Cultural Awareness

SUMBACC (Supplemental Material in Basic Arithmetic in Community Centric)		Cultural Awareness				
		Rec	Res	Emp	KA	Self-Reflection
Setting Sail:	r-value	0.10	-0.15	0.06	0.04	0.15
	p-value	0.345	0.149	0.594	0.721	0.151
	N	93	93	93	93	70
Navigating the Rapids:	r-value	-0.20*	0.36***	-0.10	0.04	-0.12
	p-value	0.049	<.001	0.362	0.690	0.255
	N	93	93	93	93	70
Rowing Through Discovery:	r-value	0.28**	0.00	0.13	013	0.21*
	p-value	0.007	0.991	0.230	0.221	0.039
	N	93	93	93	93	70
Checking the Flow:	r-value	-0.11	0.39***	-0.350***	0.30**	-0.13
	p-value	0.291	<.001	0.291	0.003	0.215
	N	93	93	93	93	70
Completing the Ride:	r-value	0.08	0.01	0.18	-0.03	0.19
	p-value	0.435	0.910	0.092	0.751	0.066
	N	93	93	93	93	70
Content Relevance:	r-value	0.21*	-0.10	0.14	-0.01	-0.01
	p-value	0.043	0.343	0.169	0.945	0.925
	N	93	93	93	93	70
Sequential Structure:	r-value	-0.10	0.35***	0.05	0.15	0.045
	p-value	0.336	<.001	0.619	0.155	0.671
	N	93	93	93	93	70
Interactivity:	r-value	0.09	-0.13	0.30**	0.17	0.40***
	p-value	0.420	0.205	0.003	0.096	<.001
	N	93	93	93	93	70
Visual Integration:	r-value	-0.12	0.35***	-0.18	0.09	-0.13
	p-value	0.254	<.001	0.080	0.383	0.231
	N	93	93	93	93	70

Note: *p<.05, ** p<.01, ***p<.001

The analysis reveals varying degrees of correlation between different components and characteristics of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) and the five dimensions of cultural awareness: recognition, respect, empathy, knowledge acquisition, and self-reflection.

The correlations show varying degrees of significance across different sections. A weak negative correlation was found between "navigating the rapids" and recognition ($r = -0.20$, $p = 0.049$), indicating that as students engage in this phase, their ability to recognize cultural aspects slightly decreases. However, the same phase showed a moderate positive correlation with respect ($r = 0.36$, $p < .001$), indicating that students who engage in this phase are more likely to develop respect for diverse cultures.

"Rowing through discovery" demonstrated a weak to moderate positive correlation with recognition ($r = 0.28$, $p = 0.007$) and self-reflection ($r = 0.21$, $p = 0.039$), indicating that this phase supports students in acknowledging cultural elements and reflecting on their perspectives.

Similarly, "checking the flow" showed a moderate positive correlation with “respect” ($r = 0.39$, $p < .001$) and “knowledge acquisition” ($r = 0.30$, $p = 0.003$), indicating that this component effectively enhances students' understanding and appreciation of cultural diversity. However, it exhibited a weak negative correlation with “empathy” ($r = -0.35$, $p = 0.291$), implying that engagement in this phase may not necessarily foster emotional connection to cultural perspectives. Among the structural elements of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric), “content relevance” showed a weak positive correlation with “recognition” ($r = 0.21$, $p = 0.043$), suggesting that relevant content aids students in identifying cultural elements.

Interactivity demonstrated a moderate positive correlation with “empathy” ($r = 0.30$, $p = 0.003$) and a strong positive correlation with “self-reflection” ($r = 0.40$, $p < .001$), indicating that interactive components in SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) enhance students' ability to empathize with cultural differences and reflect on their own cultural identity.

Meanwhile, "sequential structure" and "visual integration" were found to have a strong correlation with "respect" ($r = 0.35$, $p < .001$), reinforcing the idea that a well-structured and visually integrated approach in SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) significantly contributes to students' respect for cultural diversity, as interactive elements have a strong positive impact on students' learning.

In general, the results imply that while certain components and characteristics of SUMBACC positively influence students' cultural awareness, particularly in fostering respect, knowledge acquisition, and self-reflection, others show weaker or even negative correlations with certain dimensions.

Baltes et al. (2015) explored the impact of a cultural awareness program on students. They highlighted how such programs can effectively increase students' understanding and appreciation of different cultures. The study emphasizes integrating cultural awareness into educational programs to foster a more inclusive and respectful learning environment. Moreover, Paras (2020) reviewed the role of multicultural education in the Philippines. It examines how educational policies and practices can promote recognition and respect for cultural diversity. The review underscores the significance of cultural awareness in fostering social cohesion and reducing cultural biases in educational settings.

Significant Effect between SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) and Mathematical Proficiency

To test the significant effect between SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) and mathematical proficiency in terms of conceptual understanding, procedural fluency, strategic competence, adaptive reasoning and productive disposition, statistical treatment was performed using Jamovi 2.3.28 using regression analysis.

Table 21 presents the multiple regression analysis that was conducted to examine the influence of the components and characteristics of SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) on students' mathematical proficiency across five dimensions: Conceptual Understanding, Procedural Fluency, Strategic Competence, Adaptive Reasoning, and Productive Disposition.

The results indicate that none of the indicators show statistically significant relationships with the aspects of mathematical proficiency. All p-values are above the 0.05 significance level, suggesting that the observed t-values do not indicate meaningful differences between the variables.

The indicator setting sail, the t-values for conceptual understanding (-0.36), procedural understanding (1.05), strategic competence (-0.33), adaptive reasoning (-0.95), and productive disposition (-0.27) all result in p-values greater than 0.05, implying no significant association between these aspects of proficiency and the program component. Similarly, in the navigating the rapids section, the p-values range from 0.518 to 0.860, further reinforcing the absence of statistically significant relationships.

TABLE 21. Significant Effect between SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) and Mathematical Proficiency

SUMBACC (Supplemental Material in Basic Arithmetic in Community Centric)		Mathematical Proficiency				
		CU	PU	SC	Adaptive Reasoning	Productive Disposition
Setting Sail:	t-value	-0.36	1.05	-0.33	-0.95	-0.27
	p-value	0.718	0.297	0.739	0.346	0.786
	N	93	93	93	93	93
Navigating the Rapids:	t-value	-0.65	0.42	-0.71	-0.18	0.51
	p-value	0.518	0.675	0.482	0.860	0.614
	N	93	93	93	93	93
Rowing Through Discovery:	t-value	0.04	0.61	-0.40	0.55	0.26
	p-value	0.972	0.546	0.689	0.581	0.793
	N	93	93	93	93	93
Checking the Flow:	t-value	1.32	-0.21	1.17	-1.26	0.84
	p-value	0.192	0.834	0.245	0.211	0.405
	N	93	93	93	93	93
Completing the Ride:	t-value	0.14	0.20	-0.80	0.88	-0.84
	p-value	0.891	0.845	0.427	0.384	0.404
	N	93	93	93	93	93
Content Relevance:	t-value	-0.86	-1.12	-0.27	-0.24	0.78
	p-value	0.394	0.268	0.786	0.809	0.441
	N	93	93	93	93	93
Sequential Structure:	t-value	0.61	1.20	-0.24	0.83	0.86
	p-value	0.545	0.232	0.813	0.410	0.394
	N	93	93	93	93	93
Interactivity:	t-value	0.69	0.46	0.62	0.64	-0.02
	p-value	0.489	0.644	0.536	0.524	0.981
	N	93	93	93	93	93
Visual Integration:	t-value	-0.01	0.12	0.26	-0.45	-0.80
	p-value	0.991	0.901	0.793	0.654	0.424
	N	93	93	93	93	93

The "rowing through discovery," "checking the flow," and "completing the ride" sections also show no significant results, as indicated by the t-values and p-values. For example, in "rowing through discovery," the t-value for conceptual understanding is 0.04 ($p = 0.972$), and the t-value for procedural Understanding is 0.61 ($p = 0.546$), further supporting the absence of significant relationships as well.

Ma Jane Andaya Antonio, "Sumbacc (Supplemental Material in Basic Arithmetic in Community - Centric): Enhancement of Cultural Awareness and Mathematical Proficiency of Grade 7," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 719-732, 2025.

Similarly, the indicators of Content Relevance, Sequential Structure, Interactivity, and Visual Integration show no significant relationships with mathematical proficiency. For example, in "Content Relevance," the t-value for Conceptual Understanding is -0.86 (p = 0.394), indicating that content relevance does not significantly influence students' proficiency in any of the measured areas.

The results indicate that none of the SUMBACC components had a statistically significant effect on students' mathematical proficiency across the five dimensions. The results imply that other instructional strategies, such as differentiated instruction, active learning techniques, and reinforcement methods, may be necessary to enhance student learning outcomes. While some components, such as checking the flow and sequential structure, showed positive coefficients in multiple areas, their effects were not strong enough to be considered statistically meaningful.

Pizon & Ytoc (2021) discussed that motivation, attitude, and personalized teaching strategies significantly influence mathematical proficiency. Students who maintain a positive outlook on math and engage with effective learning styles tend to perform better. Teachers who adapt their strategies to students' needs can further enhance mathematical skills. In addition, Cullen (2023) highlighted that teacher professional development significantly influences students' mathematical proficiency. Improving teachers' mathematical knowledge and instructional strategies leads to better student engagement, understanding, and achievement in mathematics.

IV. Conclusion and Recommendations

Based on the findings of the study, the following conclusion was drawn:

There is a significant relationship between the SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) and the cultural awareness. Thus, the null hypothesis is rejected. This implies that the utilization of community-centric themes in SUMBACC has helped students develop a deeper appreciation and understanding of their cultural heritage.

There is no significant effect between the SUMBACC (Supplemental Material in Basic Arithmetic in Community-Centric) and on the mathematical proficiency. Therefore, the null hypothesis is accepted. It implies additional instructional strategies, such as differentiated instruction and reinforcement activities, are necessary to enhance students' conceptual understanding and reasoning skills.

Overall, SUMBACC serves as reliable and community-centered supplemental material that enhances students' cultural awareness and engagement in learning.

Based on the results and conclusions posted in the study, the following recommendations were formulated into the following:

The SUMBACC may be further developed to address specific areas of mathematical proficiency where students demonstrated the greatest need for improvement.

The implementation of SUMBACC may be expanded to other sections or grade levels within the school to assess its broader applicability and effectiveness in diverse classroom settings.

Future studies may include a wider range of schools or locations in to validate the effectiveness of SUMBACC in diverse cultural and geographic contexts.

Teachers may be provided with structured orientation or professional development to ensure consistent and effective delivery of the SUMBACC across various classrooms.

Future research may examine the long-term effects of SUMBACC on student learning outcomes on both academic performance and cultural awareness.

Reference

[1]. Abykanova, B., Nugumanova, S., Yelezhanova, S., Kabylkhamit, Z., & Sabiroba, Z. (2016). The use of interactive learning technology in institutions of higher learning. International Journal of Environmental & Science Education, 11(18), 12528–12539. https://files.eric.ed.gov/fulltext/EJ1124626.pdf

[2]. Acott, J. D. (2018). Interstrand crosslink resistance in Escherichia coli (Honors thesis, Portland State University). PDXScholar. https://pdxscholar.library.pdx.edu/honorstheses/577/.

[3]. Agup, R. M., & Agup, R. S. (2020). In Math, Culture Also Counts: A Case Study on the Integration of Ilokano Culture in Teaching Mathematics. Asian Journal of Education and Human Development, 1(1), 1-10.

[4]. Albalawi, M. (2022). The effectiveness of learning mathematics according to the STEM approach in developing mathematical proficiency with its five components. Education Research International, 2022, Article 5206476. https://doi.org/10.1155/2022/5206476

[5]. Andal, S. G. B., & Andrade, R. R. (2022). Exploring students' procedural fluency and written adaptive reasoning skills in solving open-ended problems. International Journal of Science, Technology, Engineering and Mathematics, 2(1), 1-15. https://doi.org/10.53378/352872

[6]. Baltes, B., Hernandez, D., & Collins, C. (2015). Increasing cultural awareness through a cultural awareness program. Journal of Educational Research and Practice, 5(1), 1-20. https://doi.org/10.5590/JERAP.2015.05.1.01

[7]. Casinillo, L., Camulte, M. C., & Raagas, D. (2020). Cultural Factors in Learning Mathematics: The Case on Achievement Level Among Badjao Students. International Journal of Indonesian Education and Teaching, 4(1), 11-20.

[8]. Cullen, J. C. (2023). Increasing mathematics proficiency and growth through focused, data-driven, professional learning (Doctoral dissertation, University of Mississippi). Electronic Theses and Dissertations, 2671. Retrieved February 23, 2025, from https://egrove.olemiss.edu/etd/2671.

[9]. Darwani, Zubainur, C. M., & Saminan. (2020). Adaptive reasoning and strategic competence through problem-based learning model in middle school. Journal of Physics: Conference Series, 1460(1), 012019. https://doi.org/10.1088/1742-6596/1460/1/012019

[10]. Dodge, J. (2016). "But I wouldn't do that": Teaching cultural empathy (Doctoral dissertation). George Fox University. https://digitalcommons.georgefox.edu/dmin/127/

[11]. Durden, T. R., de Guzman, M. R. T., Taylor, S. A., Guzman, J. M., & Potthoff, K. L. (2016). Cultural competence: An important skill set for the 21st century. Nebraska Extension Publications. https://extensionpubs.unl.edu/publication/g1375/cultural-competence-an-important-skill-set-for-the-21st-century-g1375

[12]. Edulsa, V. Jr. (2022). Conceptual understanding and academic performance of students in mathematics. Psychology and Education: A Multidisciplinary Journal, 5(9). Retrieved February 23, 2025, from https://ejournals.ph/article.php?id=20971&form=MG0AV3.

[13]. Egbokwu, J. (2024). Organizational culture and its effects on knowledge acquisition and application in the workplace: A survey of the literature. Scientific Research Journal of Arts, Humanities and Social Science, 2(1), 16-19. https://isrdo.org/journal/SRJAHS/currentissue/organizational-culture-

and-its-effects-on-knowledge-acquisition-and-application-in-the-workplace-a-survey-of-the-literature
[14]. Go, M. C., & Lomibao, L. S. (2024). Exploring learners' productive disposition towards learning mathematics: A phenomenological analysis. Sci.Int.(Lahore), 36(1), 53-58. https://www.researchgate.net/profile/Mary-Cris-Go/publication/378008424_EXPLORING_LEARNERS'_PRODUCTIVE_DISPOSITION_TOWARDS_LEARNING_MATHEMATICS_A_PHENOMENOLOGICAL_ANALYSIS/links/65c2d340790074549769b7b1/EXPLORING-LEARNERS-PRODUCTIVE-DISPOSITION-TOWARDS-LEARNING-MATHEMATICS-A-PHENOMENOLOGICAL-ANALYSIS.pdf?form=MG0AV3
[15]. Govere, L., & Govere, E. M. (2016). The effectiveness of cultural competence education in enhancing knowledge, skills, and attitudes in undergraduate health science students. Journal of Nursing Education and Practice, 6(4), 131–137. https://doi.org/10.5430/jnep.v6n4p131
[16]. Graves, K. (2016). Designing language courses: A guide for teachers. Heinle & Heinle Publishers. This study highlights the role of conclusions in summarizing the main points of a lesson. It suggests that conclusions help learners review and internalize the material covered. https://doi.org/10.1111/j.1467-1770.1996.tb01247.x
[17]. Hambrock, H., De Villiers, F., Rusman, E., MacCallum, K., & Arrifin, A. (2020). Seamless learning in higher education: Core learning concepts. Seamless Learning in Higher Education 2. Retrieved from https://pressbooks.pub/seamlesslearning2/chapter/chapter-2-core-learning-concepts/
[18]. Hästö, P., & Star, J. R. (2023). Strategy flexibility in university mathematics. https://doi.org/10.48550/arXiv.2304.12030
[19]. James, A. B. (2020). A noteworthy next class: Making learning objectives work for you. Communications in Information Literacy, 14(2), 378-388. https://doi.org/10.15760/comminfolit.2020.14.2.11
[20]. Kobayashi, K. (2019). Interactivity: A potential determinant of learning by preparing to teach and teaching. Frontiers in Psychology, 9, Article 2755. https://doi.org/10.3389/fpsyg.2018.02755
[21]. Lee, E., & Park, J. (2022). Practice-based knowledge perspectives of cultural competence in social work education. Journal of Social Work Education, 58(4), 789–803. https://doi.org/10.1080/15313204.2022.2046228
[22]. Lin, P.-H., & Hsu, Y.-F. (2021). Sequence structure organizes items in varied latent states of working memory. eLife, 10, e67589. https://doi.org/10.7554/eLife.67589
[23]. Mason, L., Tornatora, M. C., & Pluchino, P. (2015). Integrative processing of verbal and graphical information during re-reading predicts learning from illustrated text: An eye-movement study. Reading and Writing, 28(6), 851–872. https://doi.org/10.1007/s11145-015-9552-5
[24]. Mitchell, K. M. W., & Manzo, W. R. (2018). The purpose and perception of learning objectives. Journal of Political Science Education, 14(4), 456–472. https://doi.org/10.1080/15512169.2018.1433542
[25]. Moore, B. A. (2018). Developing special educator cultural awareness through critically reflective professional learning community collaboration. Teacher Education and Special Education, 41(3), 243–253. https://doi.org/10.1177/0888406418770714
[26]. Muin, A., Hanifah, S. H., & Diwidian, F. (2018). The effect of creative problem solving on students' mathematical adaptive reasoning. Journal of Physics: Conference Series, 948, 012001. https://doi.org/10.1088/1742-6596/948/1/012001
[27]. Ochoma, M. U. (2020). Curriculum content and the issue of relevance in the 21st century classroom. International Journal on Integrated Education, 3(9), 158–162. https://www.researchgate.net/publication/347602698_Curriculum_Content_and_the_Issue_of_Relevance_in_the_21st_Century_Classroom/fulltext/638962d6ca2e4b239c7e700a/Curriculum-Content-and-the-Issue-of-Relevance-in-the-21st-Century-Classroom.pdf
[28]. Oppong Frimpong, S. (2020). The role of teaching and learning materials and interaction as a tool to improve early childhood education practices: The case of Ghana. Journal of Education and Practice, 11(36), 17-26. https://files.eric.ed.gov/fulltext/EJ1287239.pdf
[29]. Paras, P. (2020). Multicultural education and the politics of recognition in the Philippines: A critical review. Jurnal Kemanusiaan, 18(2), 185–191. https://jurnalkemanusiaan.utm.my/index.php/kemanusiaan/article/view/405
[30]. Peralta, J. B. A. (2023). Effectiveness of contextualized learning resource material in kindergarten. International Journal of Advanced Multidisciplinary Studies. Retrieved from https://www.ijams-bbp.net/wp-content/uploads/2024/03/1-IJAMS-JUNE-2023-558-569.pdf
[31]. Philipp, R. A., & Siegfried, J. M. (2015). Studying productive disposition: The early development of a construct. Journal of Mathematics Teacher Education, 18(5), 489–499. https://doi.org/10.1007/s10857-015-9317-8
[32]. Piro, J. S. (2016). The role of hands-on activities in enhancing students' understanding of complex scientific concepts. Journal of Research in Science Teaching, 53(7), 1020-1035. https://doi.org/10.1002/tea.21323
[33]. Pizon, M. G., & Ytoc, S. T. (2021). A path model to infer mathematics performance: The interrelated impact of motivation, attitude, learning style, and teaching strategies variables. East Asian Journal of Multidisciplinary Research, 1(3), 315–330. https://doi.org/10.55927/eajmr.v1i3.104
[34]. Putri, D. A., Jailani, J., & Prahmana, R. C. I. (2022). Students' mathematical conceptual understanding: What happens to proficient students? Journal of Physics: Conference Series, 2165(1), 012017. https://doi.org/10.1088/1742-6596/2165/1/012017
[35]. Raiyn, J. (2016). The role of visual learning in improving students' high-order thinking skills. Journal of Education and Practice, 7(24), 115–121. https://files.eric.ed.gov/fulltext/EJ1112894.pdf
[36]. Ripmeester, N., & Deardorff, D. K. (2021). Cultural understanding as a key skill for employability. In Internationalization in higher education: Global perspectives on collaboration and transformation (pp. 215-229). Routledge.
[37]. Schulz, A. (2023). Assessing student teachers' procedural fluency and strategic competence in operating and mathematizing with natural and rational numbers. Journal of Mathematics Teacher Education, 27(4), 981-1008. https://doi.org/10.1007/s10857-023-09590-7
[38]. Sexton, B. T. (2017). Exploring the influence of students' perceptions of instructional message content relevance and experienced cognitive load on students' cognitive learning (Doctoral dissertation, University of Kentucky). University of Kentucky Libraries. https://doi.org/10.13023/ETD.2017.035
[39]. Tomlinson, B. (2023). Conclusions - Materials Development in Language Teaching. In B. Tomlinson (Ed.), Materials Development in Language Teaching (pp. 437-442). Cambridge University Press. https://doi.org/10.1017/9781139042789.024
[40]. Topping, D. (2015). An interprofessional education Russian cultural competence course: Implementation and follow-up perspectives. Journal of Interprofessional Care, 29(5), 501–503. https://doi.org/10.3109/13561820.2015.1012582
[41]. Valle Torre, M., Oertel, C., & Specht, M. (2024, March). The sequence matters in learning: A systematic literature review. In Proceedings of the 14th Learning Analytics and Knowledge Conference (pp. 263–272). ACM. https://doi.org/10.1145/3636555.3636880