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

Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material

Jerish Anne Blaza Alvarado
Laguna State Polytechnic University Sta. Cruz Laguna 4009 PHILIPPINES
Email address: jerishannealvarado@deped.gov.ph

Abstract*—This study aimed to determine if Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material aids in developing students' mathematics performance. Specifically, it sought to answer the level of acceptability of Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of components and features; students' engagement; and students' performance. It also examined the significant difference, relationship and effect among these variables. The research design utilized in this study was a descriptive correlational method using quantitative design involving thirty (30) Grade 8 students from PGMNHS selected through purposive sampling. Data was gathered through a teacher-made intervention material, test and questionnaire. The collected data were analyzed using descriptive statistics. Findings showed that the level of acceptability of Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of its components and features were Highly Accepted while the level of students' engagement were Highly Engaged. Furthermore, the level of students' performance in Mathematics before using MaCoPA was at the Beginning Level though, after using MaCoPA the students' performance rose to Approaching Proficient. In addition, it was revealed that there is a significant difference in students' performance in Mathematics. However, the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material has no significant relationship and effect with Students' Engagement and Performance in Mathematics. Since that only significant difference was identified, this resulted in rejection of the first hypothesis and acceptance of others. Therefore, it is concluded that the activities are not enough to engage the students and the needed competencies of MaCoPA is not sufficient to improve the performance of the students. Therefore, it is recommended that teachers utilize the intervention material for enhancement and remediation purposes for the incoming Grade 8 students. Develop and contextualize intervention resources that fit the needs, interests, skills, and local context of the learners. Students' involvement and comprehension can both be enhanced by materials that are relevant to their experiences.*

***Keywords*—** *Mathematics Competence and Performance Advancement, Academic Intervention Material, Students' Engagement in Mathematics and Students' Performance in Mathematics.*

I. INTRODUCTION

Mathematics is very important in helping students think critically, solve problems, and reason logically. It is a basic subject that helps students learn other subjects and get ready for making choices in real life. Even though it is very important, a lot of students have trouble understanding important math ideas and skills.

Mathematics competence means a student can correctly understand, use, and talk about math ideas. It includes understanding concepts, being able to do math procedures easily, strategic skills, reasoning ability, and having a good attitude toward math. When students do not have enough competence their academic performance in mathematics declines which may further affect their overall academic achievement.

Performance advancement is described as the growth or improvement of the student in a certain skill that needs to be enhanced. Students become better and more efficient in doing their activities or tasks in a certain period. The development of mathematics competence and performance advancement as academic intervention material aims to respond to these challenges, and it will be used by the students in improving their ability in different foundational skills in Mathematics. This intervention material is designed to strengthen students' mathematical foundations through structured activities, guided practice, contextualized problems and formative assessments. By integrating research-based strategies and competence aligned with different tasks, the tool seeks to enhance both competence and measurable academic performance.

Students' engagement and performance in Mathematics continue to reveal gaps in learners' mathematical proficiency in problem solving higher-order thinking skills and application of concepts to real-life situations. These gaps highlight the need for structured evidence-based academic interventions that directly address learners' identified weaknesses. Academic intervention materials aim to provide targeted support, reinforce foundational skills and offer differentiated instruction to meet diverse learning needs.

This study is established in the belief that timely, systematic, and learner-centered intervention can significantly enhance mathematical achievement. By developing and evaluating this intervention material, the research intends to contribute to improved instructional practices and provide educators with a reasonable tool to support academically challenged learners especially in Mathematics.

1.1 Statement of the Problem

Problem/s which were addressed by the research

Jerish Anne Blaza Alvarado, "Mathematics Competence and Performance Advancement (MACOPA) – An Academic Intervention Material," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 9, Issue 2, pp. 91-100, July 2026.

The study aimed to determine if Mathematics Competence and Performance Advancement (MaCoPA) - An Academic Intervention Material aids in developing Students' Mathematics Performance.

Specifically, the study sought to find the following research questions:

1. What is the level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of Components with regards to:
   1.1. Objectives;
   1.2. contents;
   1.3. activities; and
   1.4. assessments?
2. What is the level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of Features with regards to:
   2.1. Language Used;
   2.2. usefulness;
   2.3. appropriateness; and
   2.4. clarity?
3. What is the level of the Students' Engagement in Mathematics in terms of:
   3.1. Cognitive;
   3.2. behavioral; and
   3.3. emotional?
4. What is the level of the Students' Mathematics Performance in terms of:
   4.1. Diagnostic Test; and
   4.2. summative test?
5. Is there a significant difference on the level of Students' Performance in Mathematics in terms of Diagnostic Test and Summative Test?
6. Is there a significant relationship between Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material to the Students' Engagement in Mathematics?
7. Is there a significant effect between Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material on the Students' Performance in Mathematics?

II. Methodology

The research design utilized in this study was a descriptive correlational method using quantitative design involving thirty (30) Grade 8 students from PGMNHS selected through purposive sampling. Data was gathered through a teacher-made intervention material, test and questionnaire. The collected data were analyzed using descriptive statistics.

III. Results and Discussion

This part presents, analyzes, and interprets the data gathered that showed the difference of students' performance in mathematics and the relationship and effect of Mathematics Competence and Performance Advancement (MaCoPA) – an Academic Intervention Material to Students' Engagement and Performance in Mathematics. Using the appropriate statistical instruments and tables, the results are arranged according to a problem description. To identify crucial patterns and relationships between the variables, the data is further analyzed. The conclusions and suggestions in the subsequent chapter are based on the findings in this chapter.

Level of Acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) - An Academic Intervention Material

In this study, the level of acceptability of Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of components includes objectives, contents, activities and assessments.

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

The level of the acceptability of Mathematics Competence and Performance Advancement (MaCoPA) - An academic intervention material in terms of components with regards to objectives. The objective of MaCoPA – An Academic Intervention Material clearly stated on each topic gained the highest mean score (M=4.33, SD=0.57) and was interpreted as Strongly Agree. It was followed by the objectives that are clearly stated on each topic of Mathematics Competence and Advancement (MaCoPA) – An Academic Intervention Materia.

On the other hand, respondents Agree that the objectives of MaCoPA – An Academic Intervention Material are aligned with the intended learning competencies (M= 4.03, SD= 0.65).

Table 1. Level of Acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of its Component with regards to Objectives.

Statement The objectives of MaCoPA – an Academic Intervention Material are…	Mean	SD	Remarks
…clearly stated on each topic	4.30	0.56	Strongly Agree
…align with the intended learning competencies.	4.03	0.65	Agree
…specific, measurable, and achievable for the learners.	4.23	0.74	Strongly Agree
…attainable within the given time frame.	4.17	0.70	Agree
…appropriate to the learners' level and needs.	4.33	0.57	Strongly Agree
Weighted Mean	4.21		
SD	0.64		
Verbal Interpretation	Highly Accepted		

The overall mean of 4.21 with a standard deviation of 0.64 indicates that the level of acceptability of MaCoPA – An Academic Intervention Material in terms its component with regards to objective is Highly Accepted.

This implies that the objectives of the academic intervention material were accurate and parallel to the learning outcomes stated in the DepEd curriculum. It also indicates that the appropriateness and stating a clear objective were linked to student learning outcomes.

To sum it up, the findings highlight that the objectives of the lesson on each topic play a vital role as a part of the intervention material. Students attaining these goals can improve the learning outcomes and influence their performance in Mathematics.

Jerish Anne Blaza Alvarado, "Mathematics Competence and Performance Advancement (MACOPA) – An Academic Intervention Material," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 9, Issue 2, pp. 91-100, July 2026.

Table 2 presents the level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) - an academic intervention material in terms of components with regards to contents.

Table 2. Level of Acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of its Component with regards to Content.

Statement The content of MaCoPA – an Academic Intervention Material is…	Mean	SD	Remarks
…accurate and free from errors	4.07	0.92	Agree
…relevant to the stated objectives	4.20	0.89	Agree
…appropriate to the learners' cognitive level	4.17	0.85	Agree
…logically organized and sequential	4.27	0.78	Strongly Agree
…consist of sufficient examples and explanations	4.23	0.58	Strongly Agree
Weighted Mean	4.19		
SD	0.66		
Verbal Interpretation	Accepted		

The level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of its component with regards to content got an overall weighted mean of 4.19 with a standard deviation of 0.66 which is Accepted.

It shows that the respondents Strongly Agree that the content of MaCoPA - An Academic Intervention Material is logically organized and sequential that obtained the highest mean score (M=4.27, SD= 0.78) followed by the content of MaCoPA is consist of sufficient examples and explanations.
Meanwhile, the content of MaCoPA – An Academic Intervention Materia is accurate and free from errors got the lowest mean score (M=4.07, SD=0.92) and was marked as Agree.

This result implies that the content of the intervention material is supported by illustrative examples that are suited for the level of understanding of the students can help them understand the different foundational skills of Mathematics. The sequencing of the contents that are connected to the objectives will aid to developing the cognitive level of the students' while studying the basic concepts and it will lead to correction of student's misconceptions and error.

In summary, the findings emphasize that the importance of chronological arrangement of the contents on each topic give a better access on the knowledge and understanding. A well-designed content ensures the learning needs of the students, their misconceptions and learning gaps of the students.

Table 3 illustrates the acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) - An academic intervention material in terms of component with regards to activities.

Altogether, the weighted mean of 4.37 and the standard deviation of 0.68 shows that the level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of its component with regards to activities is Highly Accepted.

The activities of MaCoPA – An Academic Intervention Material are having a clear and easy to follow instructions gained the highest mean score (M=4.43, SD=0.67) which is interpreted as Strong Agree. While the lowest mean score (M=4.30, SD=0.70) which is also marked as Strongly Agree was obtained by the activities of an academic intervention material are aligned with the objectives on each topic.

Table 3. Level of Acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of its Component with regards to Activities

Statement The activities of MaCoPA – an Academic Intervention Material are…	Mean	SD	Remarks
…aligned with the objectives on each topic	4.30	0.70	Strongly Agree
…helping the students to develop higher-order thinking skills	4.37	0.72	Strongly Agree
…appropriate for the learners' abilities.	4.33	0.71	Strongly Agree
…engaging and promote active participation.	4.40	0.59	Strongly Agree
…having a clear and easy to follow instructions	4.43	0.67	Strongly Agree
Weighted Mean	4.37		
SD	0.68		
Verbal Interpretation	Highly Accepted		

It denotes that the activities of the academic intervention material are easy to understand, answer, and accomplish and is suited to the learner's level. It plays an important role in accomplishing the students' task while they enjoy learning. It hey provide opportunities for learners to apply knowledge, practice skills, and engage actively in the learning process.

Generally, the findings point out that activities are the key elements of intervention materials because it set the stage for students to engage, practice and reinforce what they have learned. It creates opportunities for interactive activities where the learner becomes an active part of the whole learning process instead of consuming information, engaging exercises that encourage student participation. Activity-based materials boosted learners' understanding of mathematical competencies and increased participation. The activities enabled learners to connect mathematical concepts with real-life situations, increasing engagement and understanding.

Table 4 presents the level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) - An Academic Intervention Material in terms of Components with regards to assessment.
The level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) - An academic intervention material in terms of components regarding assessment is Highly Accepted with a mean of 4.33 and standard deviation of 0.67. This implied that the academic intervention material is appropriate to the student's level of capability and ability thus the material is helpful to students learning.

The assessment of MaCoPA – An Academic Intervention Material items are clear and understandable attained the highest mean score (M=4.57, SD=0.46) indicating a Strongly Agree interpretation.

Moreover, the assessment of MaCoPA – An Academic Intervention Material measures the intended learning

Jerish Anne Blaza Alvarado, "Mathematics Competence and Performance Advancement (MACOPA) – An Academic Intervention Material," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 9, Issue 2, pp. 91-100, July 2026.

outcomes received the lowest mean score (M=4.20, SD=0.72), which is interpreted as Agree.

Table 4. Level of Acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of its Component with regards to Assessment.

Statement The assessment of MaCoPA – an Academic Intervention Material…	Mean	SD	Remarks
…is aligned with the objectives.	4.27	0.75	Strongly Agree
…measures the intended learning outcomes.	4.20	0.72	Agree
…items are clear and understandable.	4.57	0.46	Strongly Agree
…provides appropriate level of difficulty.	4.40	0.66	Strongly Agree
…allows learners to demonstrate understanding effectively.	4.23	0.74	Strongly Agree
Weighted Mean	4.33		
SD	0.67		
Verbal Interpretation	Highly Accepted		

This implied that the academic intervention material is appropriate to the student's level of capability and ability thus the material is helpful to students learning. Assessment that are aligned with the objectives can measure also measure the students' progression on each topic.

Collectively, the findings explain that the assessment is an essential part of an intervention material because it gauges students' comprehension, tracks their improvement and establishes if the learning objectives have been met. It gives the teachers and students a useful information about their strengths, shortcomings and areas that still need to work on. Incorporating assessment elements into intervention materials facilitates the identification of learning gaps, progress tracking, and enhancement of mathematical performance. These results provide credence to the inclusion of assessment as a crucial factor in determining the caliber and efficacy of intervention materials.

Level of Acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – an Academic Intervention Material in terms of its Features.

In this study, the level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material as perceived by the respondents in terms of its features with regards to: language used, usefulness, appropriateness, and clarity.

The level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of its features is presented in the following table containing the statement, mean, standard deviation, remarks and verbal interpretation.

Table 5 illustrates the level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) - An academic intervention material in terms of features with regards to language used.

The language used in MaCoPA – An Academic Intervention Material promotes comprehension of concepts acquired the highest mean score (M=4.60, SD=0.73) with an interpretation of Strongly Agree. It was followed by the language used contains vocabulary words that are appropriate to the students' level.

In contrast, also interpreted as Strongly Agree, the language used in MaCoPA – An Academic Intervention Material has instructions that are clearly stated using appropriate language attained the lowest mean score (M = 4.37, SD = 0.57).

Table 5. Level of Acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of its features with regards to Language Used.

Statement The language used in MaCoPA – an Academic Intervention Material	Mean	SD	Remarks
…is simple and easy to understand	4.43	0.59	Strongly Agree
…contains vocabulary words that are appropriate to the students' level.	4.53	0.60	Strongly Agree
…consists of sentences that are grammatically correct.	4.40	0.46	Strongly Agree
…has instructions that are clearly stated using appropriate language.	4.37	0.57	Strongly Agree
…promotes comprehension of concepts.	4.60	0.73	Strongly Agree
Weighted Mean	4.47		
SD	0.55		
Verbal Interpretation	Highly Accepted		

The overall weighted mean of 4.47 and a standard deviation of 0.55 indicated that the level of the acceptability of the MaCoPA – An Intervention Material is Highly Accepted.

This denotes that the students can simply understand and comprehend the given intervention material that displays a positive attitude towards learning. Language use is a crucial factor for assessing the efficacy and quality of intervention materials. When instructional materials use language that is comprehensible and appropriate for students' literacy levels, kids learn more efficiently. Increased interest, self-assurance, and academic success are all correlated with clear communication in instructional materials.

Generally, the finding point out that one factor that has been found to have an impact on students' comprehension, engagement, and learning experience is the language used in intervention materials. The content, instructions, exercises, and assessments will all be easily understood by the intended learners if clear, appropriate, and straightforward language is used.

Table 6 exhibits the level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) - An academic intervention material in terms of features with regards to usefulness.

The usefulness of MaCoPA – An Academic Intervention Material can be used independently by the students got the highest mean score (M=4.47, SD=0.85), interpreted as Strongly Agree. Even though it was also interpreted as Strongly Agree, the usefulness of MaCoPA – An Academic Intervention Material addresses least learned competencies got the lowest mean score (M=4.23, SD=0.89).

Table 6. Level of Acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of its features with regards to Usefulness.

Statement	Mean	SD	Remarks
The usefulness of MaCoPA – an Academic Intervention Material…			
…is helpful in improving learners' understanding of the topic	4.40	0.92	Strongly Agree
…addresses least learned competencies.	4.23	0.89	Strongly Agree
…can be used independently by the students.	4.47	0.85	Strongly Agree
…supports remediation and enrichment.	4.33	0.78	Strongly Agree
…enhances learners' engagement and interest.	4.40	0.58	Strongly Agree
Weighted Mean	4.37		
SD	0.59		
Verbal Interpretation	Highly Accepted		

All in all, the weighted mean of 4.37 with a standard deviation of 0.59 signifies that the level of acceptability of MaCoPA – An academic intervention material in terms of features with regards to usefulness is Highly Accepted.

This implies that the students enjoy learning that help them to understand basic foundational skills in Mathematics. The ability of intervention resources to address learning challenges, increase comprehension, boost engagement, and assist in achieving learning objectives is what makes them valuable. The materials helped learners understand lessons more effectively and provided opportunities for guided practice and remediation. Students' engagement and grasp of mathematical topics were improved using contextualized interactive learning resources. The students thought the resources were helpful for comprehending classes and finishing assignments.

To sum up, the findings highlight the degree to which an intervention material successfully aids students in meeting the desired learning goals, resolving learning challenges, and enhancing academic achievement is referred to as usefulness. A useful intervention material provides meaningful support to learners by offering relevant content, appropriate activities, and practical learning experiences that meet their educational needs.

Table 7 shows the level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) - An academic intervention material in terms of features with regards to appropriateness.

The appropriateness of MaCoPA – An Academic Intervention Material considers learners' diversity and needs yielded the highest mean score (M=4.43, SD=0.53) which is interpreted as Strongly Agree.

On the other hand, the appropriateness of MaCoPA – an Academic Intervention Material is suitable for the students' grade level got the lowest mean score (M=4.27, SD=0.69) but still interpreted as Strongly Agree.

The level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) - An academic intervention material in terms of features with regards to appropriateness is Highly Accepted with a mean of 4.33 and a standard deviation of 0.67.

Table 7. Level of Acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of its features with regards to Appropriateness.

Statement	Mean	SD	Remarks
The appropriateness of MaCoPA – an Academic Intervention Material…			
…is suitable for the learners' grade level.	4.27	0.69	Strongly Agree
…aligns with the intended learning competencies.	4.37	0.72	Strongly Agree
…fits to the students' cognitive abilities.	4.33	0.64	Strongly Agree
…content is relevant to real-life situations.	4.27	0.75	Strongly Agree
…considers learners' diversity and needs.	4.43	0.53	Strongly Agree
Weighted Mean	4.33		
SD	0.67		
Verbal Interpretation	Highly Accepted		

This indicates that the students learn to relate different mathematical concepts in real life situations which can help them to enjoy and appreciate Mathematics. Contextualized interactive learning tools met students' needs, skills, and curricular requirements, they were seen as acceptable. Participation and learning results were enhanced by the materials' suitability.

In summary, the findings prove that a suitable intervention resource guarantees that students can successfully comprehend, interact with, and gain from the offered learning opportunities. The length of time to which an intervention material is appropriate for the learners' age, grade level, learning needs, skills, interests, cultural background, and curriculum requirements. One important factor in assessing educational materials is appropriateness. In order to maximize efficacy, their evaluation stressed that instructional materials should be in line with characteristics of students, curriculum requirements, and educational objectives.

Table 8 illustrates the level of acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) - An academic intervention material in terms of features with regards to clarity.

Table 8. Level of Acceptability of the Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material in terms of its Features with regards to Clarity

Statement	Mean	SD	Remarks
The clarity of MaCoPA – an Academic Intervention Material…			
…shows that the objectives are clearly presented	4.53	0.46	Strongly Agree
…has a clear and easy to follow instructions	4.50	0.53	Strongly Agree
…exhibits a clearly explained examples on each topic.	4.40	0.52	Strongly Agree
…displays a clear and systematic layout and organization of the concepts	4.50	0.53	Strongly Agree
…demonstrates a logical and coherent flow of ideas	4.37	0.65	Strongly Agree
Weighted Mean	4.46		
SD	0.54		
Verbal Interpretation	Highly Accepted		

The clarity of MaCoPA – An Academic Intervention Material shows that the objectives are clearly presented

Jerish Anne Blaza Alvarado, "Mathematics Competence and Performance Advancement (MACOPA) – An Academic Intervention Material," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 9, Issue 2, pp. 91-100, July 2026.

achieved the highest mean score (M=4.53, SD=0.46) was interpreted as Strongly Agree.

Meanwhile, the clarity of MaCoPA – An Academic Intervention Material demonstrates a logical and coherent flow of ideas received the lowest mean score (M=437, SD=0.65).

Altogether, the weighted mean of 4.46 with a standard deviation of 0.54 indicates that the level of acceptability of Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material is Highly Accepted.

It implies that the students can confidently understand and comprehend the different topics that aid them to improve their skills in Mathematics.

Generally, the findings highlight that clear intervention materials help accomplish the desired learning results, lessen misunderstanding, and encourage independent learning. It guarantees that students can comprehend the material with ease, precisely follow directions, and successfully complete learning tasks, clarity is a crucial feature of intervention materials.

Level of the Students' Engagement in Mathematics

In this study, the level of the Students' Engagement in mathematics was measured through cognitive, behavioral and emotional engagement.

The findings are illustrated in the table below which include the statement, their mean score, standard deviations, remarks and corresponding verbal interpretations.

Table 9. Level of the Students' Engagement in Mathematics in Terms of Cognitive Engagement

Statement As a student in mathematics class I…	Mean	SD	Remarks
…try to understand the steps in solving mathematics problems.	4.27	0.69	Strongly Agree
…use different strategies when solving difficult problems.	4.33	0.71	Strongly Agree
…connect new mathematics lessons to what I already know.	4.50	0.53	Strongly Agree
…check my answers to make sure they are correct.	4.43	0.74	Strongly Agree
…try to learn from my mistakes in mathematics.	4.43	0.67	Strongly Agree
Weighted Mean	4.39		
SD	0.67		
Verbal Interpretation	Highly Engaged		

Table 9 presents the level of the Students' Engagement in Mathematics in terms of their Cognitive Engagement.

As a student in mathematics class I connect new mathematics lessons to what I already know gained the highest mean score (M=4.50, SD=0.53) with an interpretation of Strongly Agree. It was followed by checking my answers to make sure they are correct and trying to learn from my mistakes in mathematics.

In contrast, as a student in mathematics I try to understand the steps in solving mathematics problems obtained the lowest mean score (M=4.27, SD=0.69) but still its interpretation is Strongly Agree.

The weighted mean of 4.39 with a standard deviation of 0.67 indicates a Highly Engaged level of the students' engagement in terms of cognitive engagement.

This proves that the students are ready to attach mathematical concepts and skills on different things that they already know to maintain their enthusiasm and keep working even when they run into difficult mathematical problems. Students' use of learning tools, critical thinking, and continuous mental effort all demonstrate cognitive engagement. Teaching strategies that promote problem-solving, introspection, and teamwork greatly improve learning outcomes and cognitive engagement.

Collectively, the results emphasize that the students who actively think about and process learning materials tend to achieve better academic outcomes. Higher success, enhanced problem-solving abilities, and improved knowledge retention are all linked to increased cognitive engagement. The level to which students use learning strategies, put out mental effort, and actively engage in the learning process is known as cognitive engagement.

Table 10 presents the level of the Students' Engagement in Mathematics in terms of their Behavioral Engagement.

As a student in mathematics class I ask questions when I do not understand the topic attained the highest mean score (M=4.40, SD=0.73) which is interpreted as Strongly Agree. While, as a student in mathematics class I pay attention when my teacher explains the lesson got the lowest mean score (M=4.03, SD= 0.72) with Agree as its interpretation.

Table 10. Level of the Students' Engagement in Mathematics in Terms of Behavioral Engagement

Statement As a student in mathematics class I…	Mean	SD	Remarks
…actively participate in mathematics class discussions.	4.30	0.70	Strongly Agree
…complete my mathematics assignments on time.	4.33	0.64	Strongly Agree
…pay attention when my teacher explains the lesson.	4.03	0.72	Agree
…ask questions when I do not understand the topic.	4.40	0.73	Strongly Agree
…follow instructions carefully during mathematics activities.	4.30	0.63	Strongly Agree
Weighted Mean	4.27		
SD	0.69		
Verbal Interpretation	Highly Engaged		

The overall weighted mean of 4.27 and standard deviation of 0.69 denotes that the level of students' engagement in mathematics with respect to behavioral engagement is Highly Engaged.

This implies that when the student asks and pays attention during the discussion of a certain topic in mathematics, it will help them to improve better during their classes. Behaviorally engaged students achieve better academic outcomes and exhibit greater persistence in learning tasks. In mathematics education, behavioral engagement is reflected through participation in discussions, completion of assignments, attentiveness during lessons, and active involvement in problem-solving activities, all of which contribute to improved achievement and learning outcomes.

In summary, the findings explain that students who are behaviorally engaged, contribute positively to classroom discussions, group activities and collaborative learning experiences. This interaction enriches the learning environment for all the students. Academic achievement is closely linked to behavioral engagement, which is determined by how much time and effort students put into learning activities. Students' behavioral engagement was greatly enhanced by personalized feedback and planning cues.

Table 11 shows the level of the Students' Engagement in Mathematics in terms of Emotional Engagement.

As a student in mathematics class I feel encouraged by my teacher during mathematics lesson yielded the highest mean score (M=4.33, SD=0.64) which interpreted as Strongly Agree. The lowest mean score goes to, as a mathematics student I enjoy solving mathematics problems (M=4.13, SD=0.81).

Overall, the weighted mean of 4.23 with a standard deviation of 0.70 denotes that the level of students' engagement in Mathematics in terms of emotional engagement is Highly Engaged.

Table 11. Level of the Students' Engagement in Mathematics in Terms of Emotional Engagement

Statement As a student in mathematics class I…	Mean	SD	Remarks
…feel interested when learning mathematics.	4.27	0.62	Strongly Agree
…enjoy solving mathematics problems.	4.13	0.81	Agree
…feel motivated to do my best in mathematics class.	4.23	0.81	Strongly Agree
…feel happy when I understand a difficult mathematics lesson.	4.20	0.65	Agree
…feel encouraged by my teacher during mathematics lessons.	4.33	0.64	Strongly Agree
Weighted Mean	4.23		
SD	0.70		
Verbal Interpretation	Highly Engaged		

This signifies that students appreciate when their teachers encourage them to solve and do their best in answering mathematics problem. Students' interest, pleasure, and contentment with educational activities are indicators of emotional involvement.

In summary, the findings highlight that students are more likely to put forth effort on academic assignments, which leads to improved performance and achievement, if they enjoy studying and feel a connection to their educational experiences. Positive emotions boost scholastic performance and motivate perseverance in tackling mathematical concepts. It significantly contributes to mathematics achievement and social competence.

Level of the Students' Performance in Mathematics

In this study, the level of the students' performance was measure through diagnostic test and summative test.

The following table includes the scores, frequency, relative frequency, average mean, standard deviation, remarks, and verbal interpretation.

Table 12 illustrates the level of the students' performance in mathematics in terms of diagnostic test.

It can be gleaned from the table that most of the scores of the respondents obtained by the scores got a mean score of 10.40 and a standard deviation of 24.46 with an interpretation of Beginning.

Table 12. Level of the Students' Mathematics Performance in terms of Diagnostic Test

Scores	Frequency	Relative Frequency	Remarks
41-50	0	0%	Advanced
31-40	0	0%	Proficient
21-30	0	0%	Approaching Proficient
11-20	18	60%	Developing
1-10	12	40%	Beginning
Total	30	100%	
Weighted Mean		10.40	
SD		24.46	
Verbal Interpretation		Beginning	

The results revealed that, 18 out of 30 students, or 60% got a score of 11-20 with a remark of developing, 12 out 30 students or 40% got the score of 1-10 which is considered as beginning, and no student obtained a score from 21 to 50 which is considered as Approaching Proficient to Advanced. This result implies that students need to use an intervention material to improve their performance in Mathematics.

The results revealed that, 18 out of 30 students, or 60% got a score of 11-20 with a remark of developing, 12 out 30 students or 40% got the score of 1-10 which is considered as beginning, and no student obtained a score from 21 to 50 which is considered as Approaching Proficient to Advanced. This result implies that students need to use an intervention material to improve their performance in Mathematics.

This implies that students, before using Mathematics Competence and Performance Advancement do not have the minimum level of knowledge and core understanding of Integers. In addition, the high standard deviation reflects that the students' scores are widely dispersed around the mean. Diagnostic exams are useful instruments for determining student past knowledge, misconceptions, learning challenges, and mathematical preparedness on the topics on the basic concepts of Mathematics.

To sum up, most of the students got a low score that shows that those topic about the integers are not familiar with them. The absence of high scores indicates that the students need to improve their performance in mathematics with the help of an academic intervention material. This test can also be used in planning for a future remediation or enhancement class that can covered the learning gaps of the students on the topics that they are not familiar with.

Table 13 presents the level of the students' mathematics performance in terms of Summative test.

The weighted mean score of 28.77, with a standard deviation of 70.32, indicates that the overall performance of the students is Approaching Proficient after using Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material. The standard deviation indicates a high variation in scores.

5 out of 30 students or 17% of the respondents got a score within the range of 41-50 which is interpreted as Advanced. Meanwhile, 5 out of 30 students or 17% obtained a score of

ranging from 31-40, which corresponds to Proficient. In addition, 18 out of 30 students got a score of 21-30, or 60% of the respondents described as Approaching Proficient while, 2 out of 30 or 6% of the students attained a score of 11-20, interpreted as Developing. Clearly, no student acquires a score from 1-10 that indicates Beginning, suggesting that all students demonstrated an improvement on their performance after using Mathematics Competence and Performance Advance (MaCoPA) – An Academic Intervention Material.

Table 13. Level of the Students' Mathematics Performance in terms of Summative Test.

Scores	Frequency	Relative Frequency	Remarks
41-50	5	17%	Advanced
31-40	5	17%	Proficient
21-30	18	60%	Approaching Proficient
11-20	2	6%	Developing
1-10	0	0%	Beginning
Total	30	100%	

Weighted Mean 28.77
SD 70.32
Verbal Interpretation Approaching Proficient

This indicates that respondents understanding of integers has exceeded the core requirements and can transfer their understanding skills to solving further Mathematical problems. In summary, the findings highlight that the scores of the students show a lot of progress when they use the intervention material. The high proportion of Approaching Proficient illustrates that the students have the retention on the topics and continue to enhance their mathematical skills on integers. The students do not need to undergo a remediation on their next grade level because it is evident that they improve using the material.

Significant Difference on the Level of Students' Performance in Mathematics

In this study, the significant difference on the level of students' performance in mathematics in terms of diagnostic test and summative test was treated statistically using Real Statistics Data Analysis Tools using the T-Test for two paired samples.

The following table illustrates the test, mean, mean difference, t-value and Cohen's d.

Table 14 presents the Significant difference on the Level of Students' Performance in Mathematics.

Table 14. Significant Difference on the Level of Students' Performance in Mathematics

Test	Mean	Mean Difference	t-value	p	Cohen's d
Diagnostic	10.24	9.76	2.05	<.001	2.01
Summative	20.00				(Very Large)

df = 28; **Significant at .01 level; Cohen's d: 0.20 (Small); 0.50 (Medium); 0.80 (Large)

The results show a large improvement of student's performance on their math skills between their diagnostic test and then the summative test, as they had a mean score of 10.24 on the diagnostic test and a higher mean score of 20.00 on the summative test which translates into a mean difference of 9.76 points. The results also indicated the difference between the mean scores was statistically significant at the .01 level as evidenced by the t value of 2.05 with a corresponding p value of less than .001.

In addition, the effect size of this improvement will be measured by calculating Cohen's d which is 2.01 and will be considered "very large" in terms of practical significance. Therefore, the intervention or instructional approach used to improve student's mathematics skills had a large and important positive improvement on the student's performance in math.

Significant Relationship between Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material to the Students' Engagement in Mathematics

In this study, the significant relationship between Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material to the Students' Engagement in Mathematics was treated statistically using Jamovi 2.3.28 using the Pearson correlation coefficient.

Table 15 presents the relationship between Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material to the students' engagement in mathematics.

Table 15. Significant Relationship between Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material and the Students' Engagement in Mathematics

Mathematics Competence and Performance Advancement (MaCoPA) – an Academic Intervention Material (IV)	Students' Engagement in Mathematics (DV) Cognitive	Behavioral	Emotional
Objective: Pearson Correlation	-0.15	-0.10	0.13
Significance(2-Tailed)	0.423	0.583	0.497
N	30	30	30
Content: Pearson Correlation	0.09	0.15	-0.06
Significance(2-Tailed)	0.641	0.431	0.752
N	30	30	30
Activities: Pearson Correlation	-0.160	-0.13	0.01
Significance(2-Tailed)	0.399	0.510	0.976
N	30	30	30
Assessment: Pearson Correlation	0.20	0.35	-0.26
Significance(2-Tailed)	0.280	0.059	0.169
N	30	30	30
Language Used: Pearson Correlation	0.60***	0.11	-0.06
Significance(2-Tailed)	<.001	0.582	0.770
N	30	30	30
Usefulness: Pearson Correlation	-0.11	-0.16	-0.02
Significance(2-Tailed)	0.548	0.410	0.927
N	30	30	30
Appropriateness: Pearson Correlation	-0.02	-0.14	-0.35
Significance(2-Tailed)	0.928	0.461	0.058
N	30	30	30
Clarity: Pearson Correlation	-0.14	-0.12	-0.04
Significance(2-Tailed)	0.472	0.545	0.844
N	30	30	30

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

The results revealed that that the objective component of lesson material has no significant relationship to student engagement levels. Though weakly correlated (cognitive engagement (r=-0.15, p=0.423), and behavioral engagement

(r=-0.10, p=0.583), with a weak positive correlation for emotional engagement (r=0.13, p=0.497)), all correlations between the objective component of lesson materials and student engagement are not statistically significant. Therefore, the goals of the lesson materials have little improvement on student engagement.

Similar to the objective component of lesson materials, the content component also has very weak relationships to all types of student engagement: there is a weak positive correlation for cognitive (r=0.09, p=0.641), and behavioral (r=0.15, p=0.431), but weak negative for emotional engagement (r=-0.60, p=0.752). None of these correlations are statistically significant when it comes to measuring student engagement.

The types of activities students participate in within MaCoPA show similar results, with all weak and not significant across the four domains of engagement; while having weak negative correlations with both cognitive (r=-0.16, p=0.399) and behavioral (r=-0.13, p=0.510), there were no correlations found for emotional engagement (r=0.01, p=0.976). The data indicates that the types of activities in MaCoPA do not significantly correlates the engagement levels.

For the assessment, we see a weak positive correlation between cognitive (r = 0.20, p = 0.280), a weak positive correlation between behavior (r = 0.35, p = 0.059) and also a weak negative correlation between emotion (r = -0.26, p = 0.169). Although the correlation between assessment and behavior is approaching statistical significance, it is still not statistically significant. As a result, there is no statistically significant relationship between assessment and student engagement.

A moderately strong positive and statistically significant link exists between the language used and cognitive engagement (r = 0.60, p < .001), but it does not demonstrate any significant connections with either the behavioral (r = 0.11, p = 0.582) or emotional (r = -0.06, p = 0.770) components. This implies that the clarity and appropriateness of the language used significantly correlates the cognitive engagement in mathematics.

In addition, the three components of usefulness, appropriateness and clarity had very weak correlations to the three components of engagement, with none of the relationships being statistically significant. Furthermore, although appropriateness appeared to have a moderate negative correlation with emotional engagement (r = -0.35, p = 0.058), it was still not statistically significant. Therefore, this indicates that the three components do not have a significant relationship to the student engagement.

In summary, this implies that most components related to the MaCoPA intervention materials did not exhibit a significant relationship with student engagement related to mathematics in the cognitive, behavioral and emotional domains.

However, it is essential to note that language usage in MaCoPA intervention materials plays a significant role in supporting cognitive engagement, as the way material is presented has a direct impact on how students process and understand mathematical concepts.

According to Frederick et al. (2016), the application of self-regulated learning techniques and persistent mental effort to grasp difficult mathematical concepts. Students' success and perseverance in mathematics are strongly influenced by behavioral, cognitive, and emotional engagement. Students who are more engaged typically do better academically. Students increased involvement results in better arithmetic performance, greater motivation, and a deeper comprehension of concepts. The significance of creating intervention materials and teaching techniques that raise students' interest in mathematics

Significant Effect of Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material on the Students' Performance in Mathematics

In this study, the significant effect between Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material on the Students' Performance in Mathematics in terms of diagnostic and summative test.

Table 16. Significant Effect of Mathematics Competence and Performance Advancement (MaCoPA) – an Academic Intervention Material on the Students' Performance in Mathematics

Coefficients[a]

Diagnostic Test				
	Unstandardized Coefficients			
Model	B	Std. Error	T	Sig.
(Constant)	3.95	2.79	1.42	0.171
Objective	-0.02	0.17	-0.14	0.891
Content	-0.02	0.15	-0.15	0.885
Activities	-0.13	0.18	-0.75	0.462
Assessment	0.08	0.16	0.49	0.632
Language Used	-0.27	0.20	-1.36	0.187
Usefulness	-0.18	0.18	-0.99	0.335
Appropriateness	0.10	0.19	0.50	0.621
Clarity	-0.08	0.20	-0.39	0.703
Summative Test				
(Constant)	0.03	1.03	0.03	0.979
Objective	5.4270	5.8240	0.93	0.362
Content	0.0141	0.3526	0.04	0.968
Activities	0.0711	0.3210	0.22	0.827
Assessment	-0.0325	0.3666	-0.09	0.930
Language Used	0.0696	0.3447	0.20	0.842
Usefulness	-0.4753	0.4195	-1.13	0.270
Appropriateness	-0.2376	0.3740	-0.64	0.532
Clarity	0.1914	0.3978	0.48	0.635

A multiple regression analysis was conducted to determine whether the Mathematics Competence and Performance Advancement (MaCoPA) as an academic intervention material, in terms of objective, content, activities, assessment, language used, usefulness, appropriateness, and clarity, could significantly predict students' mathematics performance in terms of diagnostic and summative test scores.

In terms of diagnostic test scores for all components of the MaCoPA, none were statistically significant predictors of pupils' math performance; therefore, they cannot be used as

predictors of math performance in this study ($p < 0.05$). The component predictors include (a) objectives: B = -0.02, t = -0.14, p = 0.891; (b) content: B = -0.02, t = -0.15, p = 0.885; (c) activities: B = -0.13, t = -0.75, p = 0.462; (d) assessment: B = 0.08, t = 0.49, p = 0.632; (e) language used: B = -0.27, t = -1.36, p = 0.187; (f) usefulness: B = -0.18, t = -0.99, p = 0.335; (g) appropriateness: B = 0.10, t = 0.50, p = 0.621; and (h) clarity: B = -0.08, t = -0.39, p = 0.703. Of the above components, the language used had the greatest (but still not significant) negative correlation thus it did not achieve the statistically significant level.

While, formative assessment also supports the conclusion that all of the components of the MaCoPA Materials did not predict students' mathematics achievement in a statistically significant way. This includes the following measures: (a) objectivity (B = 5.4270, t = 0.93, p = 0.362); (b) content (B = 0.0141, t = 0.04, p = 0.968); (c) activities (B = 0.0711, t = 0.22, p = 0.827); (d) assessment (B = -0.0325, t = -0.09, p = 0.930); (e) language used (B = 0.0696, t = 0.20, p = 0.842); (f) usefulness (B = -0.4753, t = -1.13, p = 0.270); (g) appropriateness (B = -0.2376, t = -0.64, p = 0.532); and (h) clarity (B = 0.1914, t = 0.48, p = 0.635). Although the objective measure had the highest positive coefficient, it was still not significant, so it could not be used to predict the students' performance.

In summary, this implies that none of the MaCoPA components significantly affects students' achievement in both diagnostic and summative assessments. This means that while the components are likely to positively contribute to the instructional process, the overall effect of each component is probably quite limited. Additionally, it may be that other variables not measured in this study contribute more strongly to student achievement.

The findings were supported by Acosta-Gonzaga and Walet (2018) emphasized that due of their high stakes, summative tests have an impact on students' attitudes, motivation, and anxiety levels. When assessment activities were in line with learning objectives, summative tests were an excellent way to gauge students' mathematics ability and comprehension. Additionally, the students who had favorable attitudes regarding evaluation performed better.

IV. Conclusion and Recommendations

There is a significant difference in the level of Students' Performance in Mathematics in terms of Diagnostic Test and Summative Test. Therefore, the null hypothesis is rejected. This further implies that Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material developed and increase Students' Mathematics Performance.

There is no significant relationship between Mathematics Competence and Performance Advance (MaCoPA) – An Academic Intervention Material and the Students' Engagement in Mathematics. Hence, the null hypothesis is accepted. This indicates that Mathematics Competence and Performance Advancement (MaCoPA) – an Academic Intervention Material have learning activities that are not enough to boost Students' Engagement in Mathematics.

There is no significant effect between Mathematics Competence and Performance Advancement (MaCoPA) – An Academic Intervention Material and Students' Performance in Mathematics. Therefore, the null hypothesis is accepted. Hence, this implies that Mathematics Competence and Performance Advancement (MaCoPA) – an Academic Intervention Material do not have sufficient competence to improve Students' Performance in Mathematics.

From the findings and conclusions drawn, the following are hereby recommended for consideration.

Teachers may consider the use of the intervention material for enhancement and remedial purposes for incoming Grade 8 students as well as those in the other. Develop and contextualize intervention materials that are aligned with the learners' needs, interests, abilities, and local context. Materials that relate to students' experiences can increase engagement and improve understanding.

Students may utilize academic learning materials that were crafted and made by their teachers to strengthen and solidify their understanding of fundamental concepts in Mathematics

Principals/School Heads may incorporate in their seminars, workshops, and SLAC on how to create learning material for the teachers to be acquainted with the different strategies techniques thus assisting their students to cope with the lessons by producing their material.

Future researchers may carry out comparable investigations about the use of the learning materials as an intervention not only in mathematics but in other subject areas as well, using characteristics other than those considered in the study. A broader scope may be used in future research, considering additional variables not addressed in this work.

Reference

[1]. Acosta-Gonzaga, E., & Walet, N. R. (2018). Students' engagement in online mathematics assessments: The role of attitudinal factors. International Journal of Mathematical Education in Science and Technology, 49(6), 849–862. https://doi.org/10.1080/0020739X.2017.1405991

[2]. Fredricks, J. A., Filsecker, M., & Lawson, M. A. (2016). Student engagement, context, and adjustment: Addressing definitional, measurement, and methodological issues. Learning and Instruction, 43, 1–4. https://doi.org/10.1016/j.learninstruc.2016.02.002