EFFECT OF MASTERY FOCUSED INTERVENTION MATERIAL IN SOLVING PROBLEMS INVOLVING SEQUENCES OF GRADE 10 STUDENTS

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EFFECT OF MASTERY-FOCUSED INTERVENTION MATERIAL IN SOLVING PROBLEMS INVOLVING SEQUENCES OF GRADE 10 STUDENTS

An Action Research

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ABSTRACT

This study aimed to know the effect of Mastery Focused Intervention Material in solving problems involving sequences of Grade 10 students. It was conducted in Buenavista National High School. The least mastered competency that was the focus of the study was "Solving Problems Involving Sequences". Thus, the teacher-researchers developed an intervention material named "Focused Mastery Intervention Material" that was validated by five (5) Mathematics 10 teachers of the Buenavista Cluster. The experimental method was used to test the effectiveness of the developed intervention material. There were thirty (30) respondents in the experimental group who were exposed to intervention material and thirty respondents in the control group who were exposed to module alone. The data gathered by the teacher-researchers are found not normal thus, they used Mann Whitney U-test in comparing the means of the two groups.

The results of the study revealed that initially, there is no significant difference between the performances of the two groups of students as affirmed by the p-value of .976. This means that the students from both groups had the same level of performance in Mathematics 10 before introducing the Mastery Focused Intervention Material. On the other hand, the Mann-Whitney U value of 252.000 is affirmed by Asymp. (2-tailed) value of .003 describing that the difference in the performance of the two groups of students in their posttest was very significant. It can also be gleaned that the teacher-researchers are 99% confident that the implementation of Mastery Focused Intervention Material was effective with a very significant difference at 1% level. Furthermore, since the computed p-value of .003 was less than .005, it rejected the null hypothesis and accepted the alternative hypothesis which stated that there is a significant difference between the scores of the two groups of students in favor of the experimental group. It can also be inferred that introducing Mastery Focused Intervention Material contributed a lot to improve the performance of the students in Mathematics 10.

These findings may be associated with the intervention material introduced to the students. Mathematics teachers are encouraged to develop more intervention materials to help students who have difficulty in Mathematics, especially in this time of the new normal. The study also revealed that the initiative and creativity of the teacher to help the students easily understand the concept is very much important. Moreover, further study is recommended for the revalidation of the Mastery Focus Intervention Material. The teacher-researchers encourage other researchers to develop intervention materials focusing on other competencies of Mathematics 10.

***Keywords**: Mastery Focused Intervention Material (MFIM), validate, Grade 10 students, least mastered competencies*

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EFFECT OF MASTERY-FOCUSED INTERVENTION MATERIALS IN SOLVING PROBLEMS INVOLVING SEQUENCES OF GRADE 10 STUDENTS

I. CONTEXT AND RATIONALE

Mathematics plays a vital role in all aspects of life. It matters every day like time tracking, driving, cooking, or even in jobs like accounting, finance, banking, engineering, and teaching. These functions require a strong mathematical background and scientific experiments. Thus, K to 12 Mathematics Curriculum Guide emphasizes the importance of learning and exploring Mathematics in-depth since its value does not stop within the four corners of the classroom and school. Consequently, it is imperative for all Mathematics teachers to find ways and means on how to engage, facilitate, and arouse the interest of the learners in order to achieve the twin goals of Mathematics such as critical thinking and problem solving (Jaudinez, 2019).

However, in this new normal, teaching and learning Mathematics are indeed difficult and very challenging. In printed modules for instance, even if the mathematical problems are well-presented, still it is not enough. Thus, the teacher should find ways to explain different processes in logical order to easily grasp both the concept and the content (Saladino, 2020). Difficulty in learning Mathematics already existed even before the pandemic. In fact, it was identified that students from Junior High School had a lack of mastery in the pre-requisite competencies that hamper taking higher Mathematics in Senior High School (Jaudinez, 2019).

Similarly, based on the result of the survey conducted by the Organization for Economic Co-operation and Development (OECD) last 2012, 24% of European Union (EU) population aged 16-65 fell under Level 1 of the five-point scale. This proficiency Level 1 indicates whether the respondents can perform simple processes like locating and identifying numeric elements, counting, sorting, and even understanding of simple percentages like 20% (European Commission, 2015).

Likewise, our country, the Philippines has also struggled with performance in Mathematics. In fact, in 2018 Program for the International Students Assessment (PISA) result revealed that the standing of Filipino learners was near last among 79 participating countries in Science and Mathematics. Moreover, DepEd Secretary Leonor Briones mentioned in the 2019 Department of

Education Year-End Report that the performance of Filipino learners in the National Achievement Test (NAT) falls under low proficiency especially in Science, Mathematics and, English (Gonzales, 2019).

However, it was mentioned in MIMAROPA Regional Development Plan 2017-2022 that the National Achievement Test mean percentage score of secondary level increased from 48.20 percent in S.Y. 2010-2011 to 52.10 percent in S.Y. 2014-2015, yet still far from national passing standard of 75% (National Economic Development Authority, 2017). These persistent low performances in National Achievement Test (NAT) specifically in Mathematics is also true in our School- Buenavista National High School. It obtained low performances in Mathematics based on the results of the National Achievement Test in the School Year 2010-2011(38.96%), 2011-2012(34.70%), 2013-2014(75.98%), 2014-2015 (65.37%), 2016-2017 (36.11%). Even this School Year 2020-2021, among four grade levels in Junior High School, Mathematics 10 got the lowest mean percentage score of 41.03 in the second quarter based on the result of the summative test administered. In the third quarter, the mean percentage score of five sections in Mathematics 10 is 44.00, it improved a little but still far from 75%. Moreover, item analysis of the first quarter summative test in Mathematics 10 revealed that the competency with low mastery was *solving problems involving sequences* with an average percentage of correct response of 52%.

Moreover, the researchers are inspired by the positive results of different studies conducted related to intervention materials and their effectiveness. For instance, Peralta (2018) mentioned in her study that introducing Strategic Intervention Materials to her students generated better performance in Statistics and Probability. A similar result was gained by Montalban (2018) wherein according to her after introducing Supplementary Instructional Materials (SIMs), the student's scores in the post-test increased with a mean gain of 11.9. These findings were also supported by (Soberano, 2009), who mentioned that a higher mean was observed from the experimental group after introducing the intervention materials.

In response to DepEd Order No. 39, s.2012, requesting the teachers to develop intervention materials to address the needs of the struggling learners, the researchers developed Mastery Focused Intervention Materials in Mathematics 10, aimed to improve one of the least mastered competencies of grade 10 students in Mathematics and prepare them for their incoming higher Mathematics in Senior High School. This intervention material was named focused because it focused on one of the least

mastered competencies plus the examples and activities that will be included are localized and contextualized.

a. CONCEPTUAL FRAMEWORK

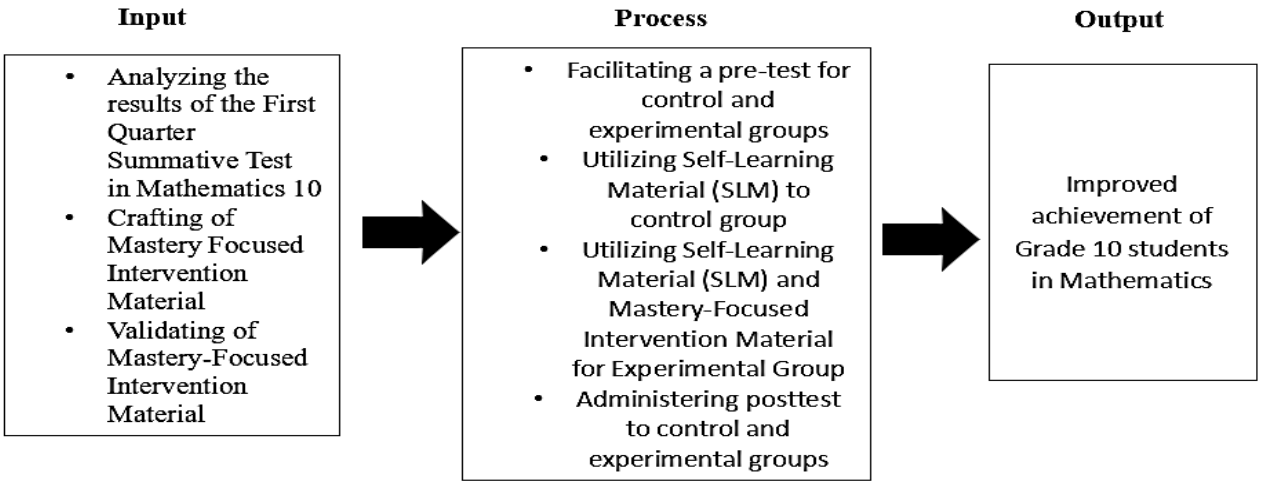

Figure 1. The Paradigm of the Study

Figure 1 shows how the researchers conducted the study. For the input of the study, the researchers crafted the Mastery Focused Intervention Material based on one of the least mastered competencies in the summative test in Mathematics 10 that was administered in the first quarter of S.Y. 2021-2022. After validating the crafted Mastery Focused Intervention Material and pilot tested by their students, a series of revisions were done following the suggestions given by the validators. Afterward, the researchers administered the pre-test based on the least mastered competency reflected on the item analysis of the first quarter summative test. The control group of students used the Self-Learning Material (SLM) alone while the experimental group used the SLM and a Mastery Focused Intervention Material. After giving the intervention, the researchers administered the posttest to the two groups of students. Posttest results determined the effectiveness of the developed intervention material.

b. THEORETICAL FRAMEWORK

This study is grounded in the theory of scaffolding which arose from Vygotsky. Scaffolding is the term given to the provision of appropriate assistance to students for them to achieve what alone would have been difficult for them. It is designed to give student's the support they need for them to

do the task independently. Scaffolding includes giving students simpler versions of problems before introducing more complex versions, giving students a worked example, and breaking learning content into smaller pieces. All of these are possessed by the material developed by the teacher-researchers aiming to improve the identified least mastered competency of the students (Gasaway, 2021).

Through the teachers facilitating the use of the self-learning module and the mastery-focused intervention material, the students are guided on the competencies that they need to master. Providing intervention material like Mastery Focused Intervention Material is a way of scaffolding the learners in learning more complex problems by starting on the simple version of the problem and going to a more complex one. Scaffolding provides a welcoming and a caring learning environment. It also increases the likelihood for students to meet instructional objectives.

b. RESEARCH HYPOTHESIS

The study tested the following hypotheses:

H_o. There is no significant difference between the scores of the control group and the experimental group in the post-test.

H_a. There is a significant difference between the scores of the control group and the experimental group in the post-test.

II. PROPOSED INNOVATION, INTERVENTION, AND STRATEGY

According to DepEd Order No. 8 Series of 2015, teachers are required to conduct remediation for the students who have difficulty in the subject. Thus, to address the low Mean Percentage Score (MPS) of Grade 10 students in Buenavista National High School specifically in Mathematics, and to improve their least mastered competencies, the researchers developed the Mastery Focused Intervention Material based on the least mastered competency of Grade 10 students in the first quarter of the School Year 2021-2022.

Mastery Focused Intervention Materials have several parts and some of them are adapted from the usual Strategic Intervention Materials (SIMs). These parts are the following:

The first part is the *Mind Setter Card*. This card sets the minds of the learners to learn the competency. In this part, the researcher could use a bible verse, a quotation, or even a puzzle that is linked to the lesson. It should be noted that in this new normal, our learners were nailed in learning the competencies through printed modules, and the intervention material specifically, the Mind Setter Card

gave students an experience that learning Mathematics is not purely numbers. Its concepts could also be seen from different perspectives.

The second part is the *Guide Card*. Indicated in this part is the focused least mastered competency that is aimed to be improved. Subtasks are also specified here. Since the main competency of the intervention material is all about solving problems involving sequences, its subtasks are: *determine the arithmetic means, nth term of an arithmetic sequence and sum of the terms of a given arithmetic sequence*, and *determine the arithmetic means, nth term of a geometric sequence and sum of the terms of a given finite and infinite geometric sequence.* The skills that are expected to acquire at the end of the session are also presented in this part.

The third part is the *Discussion Card*. The overview of the concept is discussed in this part. A series of examples are presented from simple to complex. In this Mastery Focused Intervention Material, examples are localized and contextualized for the purpose of letting the students understand and see the beauty of the concept in their context thus, the intervention is named focused.

The fourth is the *Activity Card.* It is composed of activities the learner should answer to develop the indicated skills. The tasks are competency-based, localized, and contextualized aimed to provide enough practice to students so they could perform the skills at their own pace. It also provides better ways for the students to work on it.

The fifth is the *Enrichment Card*. Activities in this part are of a higher degree of difficulty than the activities given in the Activity Card. Its main purpose is to level up the acquired knowledge of the learners in the previous examples.

The sixth part is the *On-call Mentoring Card*. In this part, space is provided to write all the queries of the learners. Its purpose is to give the students ample time to reflect on the gray areas of the material before the teacher-researchers call and facilitate the student in using the material. Also, this part aims to process all the questions of the students, despite the distance between the learners and the teachers. It aims to prepare the students in answering the assessment part of the material.

The seventh part is the *Assessment card*. In this part, the quiz to be answered by the respondents is indicated. This part aims to find out whether the respondents learned from the given intervention material and whether they had the objective of the lesson or not.

In developing this Focused Mastery Intervention Material, the researchers adopted the ADDIE Model. May (2018) mentioned that Analysis, Design, Develop, Implement, and Evaluate (ADDIE) Model has well-defined stages that make it useful in developing any instructional materials.

III. ACTION RESEARCH QUESTIONS

This study aimed to know the effect of Mastery Focused Intervention Material in Solving Problems Involving Sequences of Grade 10 students in Buenavista National High School.

Specifically, this study answered the following questions:

1. What are the mean scores of the following groups of students in their pre-test:

1.1 control group;

1.2 experimental group?

2. What are the mean scores of the following groups of students in their posttest:

2.1 control group;

2.2 experimental group?

3. Is there a significant difference in the pre-test results of the control and experimental group?

4. Is there a significant difference in the post-test results of the control and experimental group?

IV. ACTION RESEARCH METHOD

This section of the paper presents the action research methodologies used in the study. It involves the research design, how the study was conducted, who were the participants of the study, what were the data gathering tools, and the statistical treatment used in the study.

Several studies were conducted related to the effectiveness of intervention materials and a lot of positive results were obtained; however, those studies were conducted during face-to-face setup. Thus, the researchers crafted the intervention material, designed in our new normal setup to address the low Mean Percentage Score (MPS) of Grade 10 Mathematics (41.03) in the first quarter and improve the least mastered competency of the students. This intervention material was different from the usual Strategic Intervention Materials (SIMs). The researchers modified some parts of the SIMs to adapt to the distance learning setup. There are parts like Mind Setter Card and an On-call Mentoring Card. Mind Setter Card sets the mind of the learners to learn the competency. In this part, the researcher presented

any of these: a bible verse, a quotation, or even a puzzle that is connected to the lesson and later set the mind of the learners. In On-call Mentoring Card, on the other hand, the researchers called the users of the intervention material to answer queries of the students written on the On-call Mentoring Card. The researchers process the questions of the students. In this manner, the researchers prepared the learners to answer the Assessment Card of the material. Another unique feature of this intervention material is, it does not have an answer card. The purpose of this part is to give the answer to the students through phone calls and process right away the mistakes of the students in the assessment part.

During the implementation phase, the teacher researchers sent letters to the parents together with Self-Learning Material (SLM) in Mathematics 10 " Solving Problems Involving Sequences" and the additional Mastery Focused Intervention Material to the students belonging to the experimental group. The schedule of the remediation, the material/s to be used, and the teacher-researcher involved in the session were mentioned in the letter sent to the parent as reflected in appendix N. The thirty (30) students belonging to the control group were divided into three (3) since there were three teacher-researchers conducting the study. The same process was applied in the experimental group. For the control group, the teacher-researchers called the students once in the morning to refresh the Self-Learning Material in Mathematics 10 which is all about "Solving Problems Involving Sequences". On the other hand, students in the experimental group were called twice, first in the morning to refresh the lesson about "Solving Problems Involving Sequences" using the Self-Learning Material (SLM). In the afternoon the teacher-researchers focused on the questions written by the students in the On-call Mentoring Card of the Mastery Focused Intervention Materials since it was given beforehand. In checking the answers of students in the Assessment Card, the teacher-researcher processed the items that were not answered correctly by the students.

A. Participants and/or Other Sources of Information

In this study, the researchers used the Quasi-Experimental Design. According to Cristobal (2017), in the quasi-experimental, subjects are not randomly assigned to groups. Thus, the two sections of grade 10 students having closed MPS in their summative test in the first quarter were the respondents. Based on the first quarter Summative Test, the sections having closed MPS were Jade B and Emerald B. These two sections both consisted of thirty students. Thus, the total respondents of the study were sixty (60) grade 10 students.

In this study, there were two groups of participants, the experimental group, and the controlled group. The experimental group was the group in which the intervention material was tested, however, the controlled group used the Self-Learning Material alone.

B. *Data Gathering Methods*

For ethical considerations, the researchers asked permission from the principal of Buenavista National High School and discussed how the study will be conducted and how long would it take to finish the study. They set a meeting with the parents of the students who served as the respondents of the study asking permission to allow them to use the students to be part of the study. They also discussed with the parents the rationale for conducting the study and the benefits that the students of Buenavista National High School could get from it. They also secured a letter to the Schools Division Office (SDO) asking permission that they will be conducting a study in Buenavista National High School. Teacher-researchers also talked to the advisers of students who served as respondents of the study and informed them about the schedule they created for the smooth flow in giving intervention to the students.

The First Quarter Summative Test result became the basis for crafting the intervention material. The teacher-researchers focused on the identified least mastered competency- solving problems involving sequences. In developing these Focused Mastery Intervention Materials, the researchers adopted the ADDIE Model. May (2018) mentioned that Analysis, Design, Develop, Implement, and Evaluate (ADDIE) Model has well-defined stages that make it useful in developing any instructional materials. The developed intervention was validated by the five (5) Mathematics 10 teachers of the Buenavista Cluster using the survey questionnaire checklist of Fabella (2019). Three to five experts would suffice in validating the instrument of the study (Cristobal, 2017). Moreover, the selected five Mathematics 10 teachers of the Buenavista, pilot tested the material on their students. Students used the developed intervention material and answered the survey questionnaire checklist of Fabella (2019) based on their experience answering the material. A series of revisions were done based on the suggestions given by the validators. After improving the material, it was distributed to the students belonging to the experimental group.

Table 1: Overall Result of Validation of Mastery Focused Intervention Material (MFIM)

Criteria	Teachers		Students	
	Combined Median	**Verbal Interpretation**	**Combined Median**	**Verbal Interpretation**
Content	4.14	Much Valid (MV)	4.14	Much Valid (MV)
Readability	4	Much Valid (MV)	4.33	Very Much Valid (MV)
Language Appropriateness	4	Much Valid (MV)	4	Much Valid (MV)
Contextualization and localization	4	Much Valid (MV)	4	Much Valid (VMV)

Table 1 recapitulates the validity of the developed Mastery Focused Intervention Material in terms of content, readability, language appropriateness, and contextualization and localization. The table evidently reveals that the developed Mastery Focused Intervention Material for the teachers who validated it is "much valid" in terms of content with a combined median of 4.14. In terms of readability, language appropriateness, contextualization, and localization, the material is much valid with a combined median of 4.

For the students who pilot tested the material, the readability of the material is very much valid with the combined median of 4.33. In terms of content, language appropriateness, localization and contextualization, the material is much valid.

Generally, the table shows that the developed Mastery Focused Intervention Material is much valid with a median of 4.04 for the teacher-validators and a median of 4.12 for the students. It also shows that the content of the lessons is aligned to the Most Essential Learning Competencies (MELCs) set by the Department of Education, legible enough to understand by the students, the language used is appropriate and easy to understand by the students, the examples presented are localized and

contextualized that directed to the appreciation of the concept, and the lesson is helpful for the improvement of the least mastered competencies of the students. Thus, it can be surmised that the developed Mastery Focused Intervention Material is ideal for use in Mathematics 10.

In conducting the pretest and posttest, the teacher-researchers coordinated with the barangay officials of the concerned barangays where the respondents live. They conducted the said assessments face-to-face with the strict observance of health protocols prescribed by the Inter-Agency Task Force (IATF). The examinations were administered simultaneously in Brgy. Caigangan, Brgy. Poblacion, and Brgy. Libas by the three teacher-researchers.

C. Data Analysis Plan

In interpreting the data gathered from the respondents, the teacher-researchers used the mean of the pre-test and post-test of the two groups of students. Mean as defined by Abuzo et.al (2016) is used to describe a set of data where the measures cluster or concentrate at a point. However, before the teacher-researchers decided whether parametric or non-parametric tests will be used in the data gathered. They tested the normality of the data using the Shapiro-Wilk Test as shown in appendix P. Initially, scores in the pre-test of the two groups of students are approximately normally distributed since the p-values are .363 and .509 respectively which are both above .05 to consider normal. However, in the experimental group, the p-value is .042 which is below .05. This means that the data are not normal. Since the data gathered from the post-test of the experimental group are not normal, the teacher-researchers decided to use the alternative of t-test in the non-parametric test which is the Mann-Whitney U-Test.

RESULTS AND DISCUSSION

The succeeding textual and tabular presentations congruently and categorically answered the specific objectives raised before the conduct of this applied research. The mean scores of the pre-test of the two groups of respondents in this action research are presented in the following tables:

Table 2. The Test Scores of the Control Group and Experimental Group of Students in Their Pre-Test

Control Group (Student)	Pre-test	Experimental Group (Student)	Pre-test
1	7	1	9

2	5	2	9
3	7	3	6
4	4	4	10
5	6	5	4
6	7	6	10
7	5	7	4
8	6	8	10
9	8	9	6
10	4	10	8
11	4	11	3
12	9	12	3
13	10	13	9
14	3	14	4
15	8	15	5
16	6	16	6
17	12	17	8
18	10	18	5
19	6	19	7
20	11	20	4
21	6	21	11
22	8	22	5

23	3	23	11
24	10	24	8
25	6	25	10
26	9	26	7
27	8	27	7
28	8	28	6
29	7	29	7
30	13	30	13
MEAN	**7.233**	**MEAN**	**7.167**
SD	**2.552**	**SD**	**2.640**

Table 2 shows that the average score on the pre-test of the respondents under the control group is 7.233. It can also be gleaned that the highest score in the said pre-test is 13 while the lowest score is 3. Another observation that can be drawn from the table is, the students still remember the concepts covered in the pre-test as manifested in the scores obtained. However, the scores also reveal that there is a need to improve the performance of the students in the said test since the passing score of a fifteen-item test is twelve (12) and above.

Furthermore, the average score of the students in the experimental group as shown in table 2 is 7.167. It can be gleaned that the performance of the two groups of students was very close as reflected in their mean scores of 7.2333 and 7.167 respectively. It can also be observed that the highest score of the students in their pre-test under the experimental group is 13 while the lowest score is 3. The scores in table 1.2 reflect those students in the experimental group still remember the concepts covered by the pre-test. However, there is really a need to provide assistance to the students in order to improve their performance since 3.33% of the respondents in this group got a passing score of twelve (12) to fifteen (15).

Table 3: Test Scores of the Control Group and Experimental Group of Students in Their Pre-Test and Post-Test

Control Group (Student)	Pre-test	Post test	Gain	Experimental Group (Student)	Pre-test	Post Test	Gain
1	7	10	3	1	9	12	3
2	5	9	4	2	9	11	2
3	7	7	0	3	6	9	3
4	4	6	2	4	10	11	1
5	6	5	1	5	4	13	9
6	7	8	1	6	10	13	3
7	5	7	2	7	4	9	5
8	6	6	0	8	10	13	3
9	8	10	2	9	6	8	2
10	4	5	1	10	8	9	1
11	4	9	5	11	3	8	5
12	9	9	0	12	3	8	5
13	10	11	1	13	9	10	1
14	3	6	3	14	4	8	4
15	8	11	3	15	5	9	4
16	6	10	4	16	6	9	3

17	12	12	0	17	8	10	2
18	10	10	0	18	5	11	4
19	6	6	0	19	7	10	3
20	11	12	1	20	4	8	4
21	6	6	0	21	11	13	2
22	8	10	2	22	5	12	7
23	3	4	1	23	11	13	2
24	10	11	1	24	8	11	3
25	6	7	1	25	10	12	2
26	9	13	4	26	7	12	5
27	8	10	2	27	7	11	4
28	8	6	2	28	6	10	4
29	7	8	1	29	7	10	3
30	13	13	0	30	13	14	1
MEAN	**7.233**	**8.567**	**1.567**	**MEAN**	**7.167**	**10.567**	**3.333**
SD	**2.552**	**2.542**		**SD**	**2.640**	**1.832**	

Table 4.1 shows the scores of the students in the posttest after refreshing the module about “Solving Problems Involving Sequences” It can be observed that students in the control group increased their mean score of 1.334 from 7.233 mean score in the pre-test it became 8.567. This means that students in control group improved their performance in the posttest as they refresh the module about “Solving Problems Involving

Sequences". Indeed, going back to the lessons that need to refresh provides an opportunity for the students to master the concept and use it with more automaticity.

On the other hand, the student's scores in the experimental group increased their scores in the posttest from 7.167 mean score to 10.567. It can be inferred that introducing Mastery Focused Intervention Material helped students improve their achievement in Mathematics 10 as reflected in their post-test result. Indeed, in this time of the pandemic, helping the students understand the lessons by providing different learning experiences despite the distance between students and teachers is important. Similarly, Raymond (2000) mentioned that teachers have a big role in supporting the learner's and providing support structures to improve his/her performance. Likewise, it was mentioned by Gray (2001) that responses that create a satisfying effect in a particular situation become more likely to occur again in that situation. Thus, if we could introduce intervention material to our students in a way that they will appreciate it even in this time of new normal, chances are we could help them improve their performance in the subject. Moreover, Macdogal (2008) explained that the use of Strategic Intervention Material (SIM) developed autonomous learning among learners. Likewise, Abuda (2019) opined that his developed Strategic Intervention Material did not only provide related concepts and information about the competencies but also profound activities that encouraged his students to think and enabled them to reflect on their own.

Table 4. Pre-test and Post-test of Control and Experimental Groups Results Using Mann-Whitney U Test

Variables	Mann-Whitney U	Asymp. Sig.(2-tailed)	Result	Decision
Pre-test	448.000	.976		Retain the null
posttest	252.000	.003	Very significant	Reject the null

Table 4 shows the difference in the performance of the two groups of students exposed and not exposed to Mastery Focused Intervention Material. Before introducing the materials to the students, the teacher-researchers administered a pre-test anchored on the identified least mastered competency. Students belonging to the control group refresh the lesson "Solving Problems Involving Sequences"

using Self-Learning Module 6 while the experimental group also refreshed the said topic but was also exposed to Mastery Focused Intervention Material.

It can be observed from table 4 that, initially, there is no significant difference between the performances of the two groups of students as affirmed by the p-value of .976. This means that the students from both groups had the same level of performance in Mathematics 10 before introducing the Mastery Focused Intervention Material. On the other hand, the Mann-Whitney U value of 252.000 is affirmed by Asymp. (2-tailed) value of .003 describing that the difference in the performance of the two groups of students in their posttest was very significant. It can also be gleaned that the teacher-researchers are 99% confident that the implementation of Mastery Focused Intervention Material was effective with a very significant difference at 1% level. Furthermore, since the computed p-value of .003 was less than .005, it rejected the null hypothesis and accepted the alternative hypothesis which stated that there is a significant difference between the scores of the two groups of students in favor of the experimental group. It can also be inferred that introducing Mastery Focused Intervention Material contributed a lot in improving the performance of the students in Mathematics 10.

The findings of the study are also true with the findings given by Montalban (2018) wherein she said that after introducing the Supplementary Instructional Material (SIM), the students' scores increased in the posttest by achieving an average of 23.7 and with the mean gain of 11.9. Similar result was obtained by Soberano (2009) wherein according to him, a higher mean was observed from the experimental group after the presentation of intervention materials.

Reflection

The Covid-19 pandemic brought so much transformation to our educational system. A lot of adjustments were done just to make sure that education will continue. However, students struggled a lot to learn and survive their studies due to a lack of skills to study on their own. As teachers, a strong connection beyond the module is very much important by providing immediate assistance as needed by students. Mastery Focused Intervention Material is a sort of assistance that we could give to our students to improve their skills, especially in the least mastered competencies. This material is also a way of letting our students realize that we are finding ways and means just to provide support for their difficulties in the subject. According to Llego (n.d.), teachers are responsible for monitoring the progress of learners and providing remediation and assistance as needed. Indeed, teachers' assistance plays an important role in improving students' progress in the subject.

Conclusion

Based on the findings of the study, the following conclusions were drawn:

1. The performance level of the experimental and control groups of students before using the Mastery Focused Intervention Material were comparable as reflected in their pre-test results.
2. There was an increase in the level of performance of the two groups of students in the least mastered competency as reflected in the posttest results.
3. The experimental group who was exposed to Mastery Focused Intervention Material performed better with a significant difference compared to control group who received module 6 alone.

V. ACTION PLAN

This part presents what the teacher-researchers do with the results of their study.

ACTIVITY	OBJECTIVE	TIME FRAME	PERSONS INVOLVED	EXPECTED OUTPUT
Presentation of the results of the study to the principal of Buenavista National High School	To inform the principal of Buenavista National High School regarding the results of the study	May 19, 2022	Principal and the Teacher-Researchers	Informed the principal regarding the results of the study
Presentation of the results of the study to the parents of the students	To inform the parents of the students who were involved in the study regarding the	May 20, 2022	Parents Principal and the Teacher-Researchers	Informed the parents of the students who were involved in the study regarding the

who were involved in the study	results of the study			results of the study
Sharing of the findings of the study during the mid-year In–Service Training	To inform the teaching personnel of Buenavista National High School regarding the results of the study	May 31, 2022	Teacher-Researchers Buenavista National High School teaching personnel	The teachers crafted Intervention Materials to address the needs of the learners in their respective subject area

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APPENDIX A

Item Analysis
First Quarter Summative Test

Department of Education
Region IV-MIMAROPA
Division of Marinduque
BUENAVISTA NATIONAL HIGH SCHOOL
Brgy. Uno, Poblacion, Buenavista Marinduque

ITEM ANALYSIS

Name of School : **BUENAVISTA NATIONAL HIGH SCHOOL**
District/ Cluster : **BUENAVISTA**
School Head : **THELMA M. SALVACION**
Grade: **10**
Grading Period: **FIRST QUARTER**
Subject : **MATHEMATICS 10**
Subject Teacher : **NANETH P. FABELLA**

No. of Cases: 146					HPS: 60
HSO: 60	LSO: 7	Mean : 48**.12**	SD : 5.10		MPS : 78
Level of Proficiency	O: 28	VS : 35	S : **45**	FS : 39	DNME :8

Competency	**Item No.**	**No. of Correct Responses**	**Percentage of Correct Responses**	**Average**	**Interpretation**

Generates pattern	1	112	77	72	Moving towards mastery
	2	123	84		
	3	98	67		
	4	85	58		
Illustrate an arithmetic sequence	5	99	68	67	Moving towards mastery
	6	95	65		
Determine arithmetic means, nth term of an arithmetic sequence and sum of the terms of a given arithmetic sequence	7	78	53	64	Moving towards mastery
	8	89	61		
	9	98	67		
	10	120	82		
	11	112	77		
	12	100	68		
	13	89	61		
	14	76	52		
	15	79	54		
Illustrate a geometric sequence	16	78	53	60	Moving towards mastery
	17	89	61		
	18	98	67		
	19	101	69	73	

Differentiate a geometric sequence from an arirthmetic sequence	20	109	75		Moving towards mastery
	21	100	68		
	22	115	79		
Determine geometric means, nth term of a geometric sequence and sunm of the terms of a given finite or infinite geometric sequence	23	123	84	67	Moving towards mastery
	24	76	52		
	25	78	53		
	26	95	65		
	27	118	81		
Solves problems involving sequences	28	87	60	52	Low mastery
	29	63	43		
	30	78	53		
Performs division of polynomials using long division and synthetic division	31	85	58	61	Moving towards mastery
	32	85	58		
	33	99	68		
Proves the Remainder Theorem, Factor Theorem and the Rational Root Theorem	34	85	58	63	Moving towards mastery
	35	90	62		
	36	87	60		
	37	89	61		
	38	111	76		

Factor polynomials	39	91	62	64	Moving towards mastery
	40	125	86		
	41	69	47		
	42	95	65		
	43	87	60		
	44	89	61		
	45	100	68		
Illustrates polynomial equations	46	112	77	66	Moving towards mastery
	47	125	86		
	48	79	54		
	49	73	50		
	50	112	77		
	51	95	65		
	52	95	65		
	53	76	52		
Solve problems involving polynomials and polynomial equations	54	89	61	62	Moving towards mastery
	55	98	67		
	56	87	60		
	57	86	59		

	58	85	58		
	59	99	68		
	60	85	58		

Numbers of Learners Tested	**146**
Numbers of Test Items	**60**

LEGEND	
80 and above	Mastered
60-79	Moving towards mastery
59 and below	Low mastery

Prepared by:

Sgd.NANETH P. FABELLA

SST-III

Checked by:

Sgd.JOSIAS T. SALVACION, JR.

Master Teacher I

Noted:

Sgd.THELMA M. SALVACION

School Principal I

APPENDIX B

APPENDIX B

CONTENT VALIDATION OF QUESTIONNAIRE / INSTRUMENT

NAME OF VALIDATOR	
HIGHEST EDUCATIONAL DEGREE	
POSITION/DESIGNATION	
YEARS IN SERVICE	
RESEARCH TITLE	

Direction: This tool asks for your evaluation of the questionnaire to be used in the data gathering for the investigation stated above to establish its validity. Kindly provide your honest assessment using the criteria state below. Please check only one from the selection.

Scale	Interpretation	Description
5	Very Highly Valid	The questionnaire can provide unbiased data for the investigation, allowing 0-5% error
4	Highly Valid	The questionnaire can provide unbiased data for the investigation, allowing 6-10% error
3	Valid	The questionnaire can provide unbiased data for the investigation, allowing 11-15% error
2	Less Valid	The questionnaire can provide unbiased data for the investigation, allowing 16-20% error
1	Not Valid at all	The questionnaire can provide unbiased data for the investigation, allowing 21-25% error

A. Validator's Questionnaire Assessment

INDICATORS	RATING				
	5	4	3	2	1
The indicators in the questionnaire consistently and accurately measure each variable of the investigation					
The questionnaire fits with the variables under investigation, thus measuring what it intends to measure					
The questionnaire has the capacity to measure items of variables within a given timeframe					
The questionnaire has the ability to distinguish the characteristics or properties of differing attributes of the subjects under study					
The questionnaire has the ability to gather factual data, eliminating biases and subjectivity					
The questionnaire has the ability to generate quick and complete data within the timeframe					

B. Validator's remarks and suggestions.:

_____

_____

_____

_____

APPENDIX C

Questionnaire Checklist

Validity of the Developed Mastery Focused Intervention Material Checklist

Questionnaire

Name of Validator (Optional): _____ Present Position: _____

Name of School: _____

Number of years teaching Mathematics 10: _____

Age: _____ Sex: _____

Highest Educational Attainment: ( )Doctoral ( )Master's Degree

( ) Bachelor's Degree

Licensure Examination Passed: ( ) PBET ( ) LET ( )Engineering

Directions: Please put a check (✓) on the specified column based on your evaluation of Mastery Focused Intervention Material. Kindly refer to your answer from the given descriptive below.

Scale	Range	Verbal Interpretation
5	4.20-5.0	Very Much Valid (VMU)
4	3.41-4.19	Much Valid (MV)
3	2.61-3.40	Moderately Valid (VM)
2	1.81-2.60	Least Valid (LV)
1	1.00-1.80	Not Valid (NV)

Indicators	5	4	3	2	1
	Very Much Valid	**Much Valid**	**Moderately Valid**	**Least Valid**	**Not Valid**
Characteristics of the Mastery Focused Intervention Material in terms of content.					
. The lesson is relevant to the topics covered in Mathematics					
. The lesson is presented at a pace that allows for reflections and review					
. The content leads to the attainment of the objectives					
. There is adequate presentation/discussion of the content					
. The information about the topic is accurate and precise.					
. The ideas, concepts, and points are well presented.					
. The lessons are aligned with the most essential learning competency.					

Characteristics of the Mastery Focused Intervention Material in terms of readability					
. The exercises coincide with the learning level of the students					
. The words used in the Mastery Focused Intervention Material are correctly used.					
. The directions/instructions in the lessons are clearly stated.					
. Instructions to students are not vague and easy to follow.					
. Vocabularies used are suited to the reading and understanding of the students.					
. The material is readable.					
Characteristics of Mastery Focused Intervention Material in terms of language appropriateness					

. The presentation is clear and coherent					
. The directions given are clear and easy to understand					
. There is sufficient familiar vocabulary to ensure the target level.					
. The structure, style, and format are appropriate to the target level.					
Characteristics of the Mastery Focused Intervention Material in terms of contextualization and localization					
. The activities presented are localized.					
. The topic is presented within the social context of the students who will use the Mastery Focused Intervention Material.					
. The activities are leading to the appreciation of the concept in real life.					

Adapted from the study of Fabella (2019) with modifications

APPENDIX D

Indicators	Math 10 Teachers		Students	
	Median	**Verbal Interpretation**	**Median**	**Verbal Interpretation**
. The lesson is relevant to the topics covered in Mathematics	4	Much Valid (MV)	5	Very Much Valid (VMV)
. The lesson is presented at a pace that allows for reflections and review	4	Much Valid (MV)	4	Much Valid (MV)
. The content leads to the attainment of the objectives	4	Much Valid (MV)	4	Much Valid (MV)
. There is adequate presentation/discussion of the content	4	Much Valid (MV)	4	Much Valid (MV)
. The information about the topic is accurate and precise.	4	Much Valid (MV)	4	Much Valid (MV)
. The ideas, concepts, and points are well presented.	4	Much Valid (MV)	4	Much Valid (MV)
. The lessons are aligned with the most essential learning competency.	5	Very Much Valid (VMV)	4	Much Valid (MV)

Table 1: Characteristics of Mastery Focused Intervention Material in terms of content

Indicators	Math 10 Teachers		Students	
	Median	**Verbal Interpretation**	**Median**	**Verbal Interpretation**
1. The exercises coincide with the learning level of the students	4	Much Valid (MV)	5	Very Much Valid (VMV)
2. The words used in the Mastery Focused Intervention Material are correctly used.	4	Much Valid (MV)	4	Much Valid (MV)
3. The directions/instructions in the lessons are clearly stated.	4	Much Valid (MV)	4	Much Valid (MV)
4. Instructions to students are not vague and easy to follow.	4	Much Valid (MV)	4	Much Valid (MV)
5. Vocabularies used are suited to the reading and understanding of the students.	4	Much Valid (MV)	4	Much Valid (MV)
6. The material is readable.	4	Much Valid (MV)	5	Very Much Valid (VMV)

Table 2: Characteristics of Mastery Focused Intervention Material in terms of readability

Indicators	Math 10 Teachers		Students	
	Median	**Verbal Interpretation**	**Median**	**Verbal Interpretation**
1. The presentation is clear and coherent.	4	Much Valid (MV)	4	Much Valid (MV)
2. The directions given are clear and easy to understand	4	Much Valid (MV)	4	Much Valid (MV)
3. There is sufficient familiar vocabulary to ensure the target level.	4	Much Valid (MV)	4	Much Valid (MV)
4. The structure, style, and format are appropriate to target level.	4	Much Valid (MV)	4	Much Valid (MV)

Table 3. Characteristics of Mastery Focused Intervention Material in terms of language appropriateness

Indicators	Math 10 Teachers		Students	
	Median	**Verbal Interpretation**	**Median**	**Verbal Interpretation**
1. The activities presented are localized.	4	Much Valid (MV)	4	Much Valid (MV)
2. The topic is presented within the social context of the students who will use the Mastery Focused Intervention Material.	4	Much Valid (MV)	4	Much Valid (MV)
3. The activities are leading to the appreciation of the concept in real life.	4	Much Valid (MV)	4	Much Valid (MV)

Table 4. Characteristics of Mastery Focused Intervention Material in terms of contextualization and localization

APPENDIX E

PRE-TEST/ POST TEST
BUENAVISTA NATIONAL HIGH SCHOOL
Buenavista, Marinduque

Name:_____ Score: _____
Grade/ Group_____

MELCS:

- *determines arithmetic means, nth term of an arithmetic sequence and sum of the terms of a given arithmetic sequence* ***M10AL-Ib-1***
- *determines geometric means, nth term of a geometric sequence and sum of the terms of a given finite or infinite geometric sequence* ***M10AL-Id-2***

Directions: Read each item carefully. Choose the letter of the correct answer.

_____1. In an arithmetic sequence 11, 9, 7. . . , what is the 5th term?
A. 5 B. 3 C. 1 D. -3

_____2. What is the 10th term in the harmonic sequence $\frac{3}{7}, \frac{3}{11}, \frac{1}{5}, \frac{3}{19}$...?
A. $\frac{3}{17}$ B. $\frac{17}{3}$ C. $\frac{43}{3}$ D. $\frac{3}{43}$

_____3. What is the next term in the Fibonacci sequence 1,1, 2, 3, 5, 8, 13,… ?
A. 21 B. 13 C. 34 D. 55

_____4. The first term of an arithmetic sequence is 2 while the 18th term is 87. What is the common difference of the sequence?
A. 7 B. 6 C. 5 D. 3

_____5. If three arithmetic means are inserted between 11 and 39, find the second arithmetic mean
A. 18 B. 25 C. 32 D.46

_____6. What is the next term in the geometric sequence 4, -12, 36?
A. -42 B. -54 C. -72 D. -108

_____7. Find the 5th term of the geometric sequence 48, 24,12,...
A. 3 B. 2 C. 1 D. $\frac{1}{3}$

_____8. In the arithmetic sequence 6, 12, 18, 24,30, ... which term is 120?
A. 10 B. 15 C. 20 D. 25

_____9. During a free-fall, a skydiver jumps 16 feet, 48 feet, and 80 feet on the first, second, and third fall, respectively. If he continues to jump at this rate, how many feet will he has jumped during the SIXTH fall?
A. 100 B. 112 C. 144 D. 176

_____10. The weekly increase in the height (in centimeters) of a certain plant follows the pattern: 1, 3, 9, …If this continues, how much height has it grown on the 8th week?
A. 6 561 cm B. 2 187 cm C. 1 536 cm D. 1 409 cm

_____11. My school is raising a fund to help the poor families in a certain barangay which is affected by the COVID 19 pandemic. If each student contributes P50 each month and it increases by P10 for each succeeding month. How much will be the total contribution of a student in 3months?

A. P150 B. P180 C. P210 D. P240

_____12.JM bought a smartphone that costs P18, 000. An expert says that this smartphone depreciates its value by 8% per year. Will I still be able to sell my phone by P7000 after 5 years?

A. No, because the selling price is lower that its depreciated value.
B. No, because the selling price is higher that the depreciated value.
C. Yes, because the selling price is lower than the depreciated value.
D. Yes, because the selling price is higher than the depreciated value

_____13. Rose drives from house to her work at the speed of 55kph. Returning home, her speed decreases to 45 kph. What is the average speed of Rose for the round trip? A. 49.5 kph B. 50 kph C. 50.5 kph D. 51 kph

_____14. Based on the song below, the receiver received gifts on the first, second and third day of Christmas respectively. How many total gifts have she received?

On the first day of Christmas my true love sent to me:
A partridge in a pear tree
On the second day of Christmas my true love sent to me:
Two turtle doves and
A partridge in a pear tree

On the third day of Christmas my true love sent to me:

Three French hens

Two turtle doves and

A partridge in a pear tree

A. 8 B. 9 C. 10 D. 12

_____15. John Angel is at the top of 30 feet building and he is going to drop the ball into the ground. When the ball bounces, it reaches a height that is $\frac{1}{3}$ of the previous height. What is the total distance travelled by the ball?

A. 50 feet B. 60 feet C. 70 feet D. 80 feet

APPENDIX F

Pre-test pictures

APPENDIX G

PICTURES POST-TEST

APPENDIX H

Mastery Focus Intervention Material

Republic of the Philippines
Department of Education
Schools Division of Marinduque

INFORMED CONSENT TO PARTICIPATE IN THE STUDY

A. PURPOSE AND BACKGROUND

The researchers, **NANETH P. FABELLA, ANA LIZA MARQUEZ,** and **JACQUELINE SADIWA,** are conducting a research entitled *"Effectiveness of Mastery Focused Intervention Materials to the Performance of Grade 10 Students"*. The purpose of your participation in this research is to help the researcher to meet and address the various objectives of the study, and the variables that accompany it.

B. PROCEDURES

If you agree to participate in this research study, the following will occur:

1. Administration of pre-test and posttest face-to-face in your barangay with observance of proper health protocols as prescribed by AITF.
2. Students will be receiving and answering the two (2) modules of least mastered competencies in Mathematics 10 on the 7th and 8th weeks of distribution of modules.
2. Actual collection, retrieval, processing, and storage of gathered data.
3. Treatment of data to enable the researcher to draw out conclusions and recommendations of the study.
4. Dissemination of study's findings, conclusions, and outputs.

C. CONFIDENTIALITY

The records from this study will be kept as confidential as possible. No individual identities will be used in any reports or publications resulting from the study. All data collection and retention method i.e. questionnaires, summaries, will be given codes and stored separately from any names or other direct identification of participants. Research information will be kept in locked files at all times. Only research personnel will have access to the files, and data collection and retention methods, and only those with essential needs to see the names or other identifying information will have access to that particular file.

APPENDIX I

Test of Normality Result

Table 5: Test of Normality using Shapiro-Wilk Test

	Groups	Statistic	df	Sig
Pretest	Experimental	.963	30	.363
	Control	.969	30	.509
Posttest	Experimental	.927	30	.042
	Control	.948	30	.151

APPENDIX J

Profile of Validators

Validator 1

Educational Attainment: *Master of Arts in Education major in Mathematics Teaching*

Degree Earned: *Complete Academic Requirements (CAR)*

Current Designation: *Master Teacher I*

Number of Years Teaching Mathematics 10: *19*

Validator 2

Educational Attainment: *Master of Arts in Education major in Mathematics Teaching*

Degree Earned: *Complete Academic Requirements*

Current Designation: *SST I*

Number of Years Teaching Mathematics 10: *5 years and 8 month*

Validator 3

Educational Attainment: *BSE Major in Mathematics*

Degree Earned: *Undergrad-Master's Degree*

Current Designation: *SST I*

Number of Years Teaching Mathematics 10: *9 years*

Other Experience: *High School teacher and college instructor in private school (1988-2012)*

Validator 4

Educational Attainment: *College graduate/9 units master of arts in teaching Mathematics*

Degree Earned: *Bachelor of Secondary Education major in Mathematics*

Current Designation: *SST I*

Number of Years Teaching Mathematics 10: *6 years*

Validator 5

Educational Attainment: *BSEd- Mathematics*

Degree Earned: *BSEd- Mathematics*

Current Designation: *SST I*

Number of Years Teaching Mathematics 10: 4

Other Experience: *Junior High School Teacher*