Effectiveness of Blended Learning Modality to The Performance of The Grade 10 Students in Mathematics

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Abstract — This study aimed to determine the Effectiveness of blended learning modality to the Performance of the Grade 10 students in Mathematics enrolled in SY 2021-2022. The findings of the study served as a basis for a proposed improvement plan. This study used the quasi-experimental method of research to evaluate the effectiveness of Blended Learning Approach to the performance of the Grade 10 students in Mathematics. The researcher utilized Universal Sampling in identifying the respondents of the study. The test of difference between paired samples t-test on the Mathematics Performance of the Grade 10 students in Mathematics before and after the integration of blended learning approach during the teaching and learning process or in the delivery of the different most essential learning competencies in Mathematics subject. Based on the findings found in table 3, the result of the t-test for paired samples indicate that the posttest mean of 24.6 is significantly higher compared to the pretest mean of 12.7 (t= -14.956, df = 19, p-value <.001). Therefore, the null hypothesis which states that there is no significant difference between mean pretest and mean posttest scores of the students is rejected.

The result of this study indicates that the blended learning modality of teaching mathematics could potentially enhance the learning of the Grade 10 students in learning the subject specially those learning competencies which need more attention. The integration or utilization of the blended learning modality is significantly effective in improving the performance level of the Grade 10 students in Mathematics because of the fact that there were a big increase on the result of the pretest and post-test performance of the Grade 10 students in learning the different learning competencies in Mathematics which could really help the students increase their performances and could create active involvement and participation in answering the worksheets of the different learning competencies.

Keywords Effectiveness; Blended Learning Modality; Mathematics Performance; Grade 10 Students

I. Introduction

Mathematics is one of the subjects where students have difficulties in relating it to real life. For many students, it is a subject where they simply memorize concepts and formulas without really understanding its applications.

In todays' pandemic situation, learners cannot understand well the lesson, except for advanced learners, especially that the learning delivery mode used is modular print or printed self-learning modules. Learners need guidance from teachers particularly in Mathematics subject where examples found in the modules is not enough to make the learners understand more about the concept. They need verbal explanations rather than reading it from the printed materials or modules. In other words, they need other supplement aside from the modules they received.

The Philippines had also done the same thing but since we need to adapt with the current situation and education should not be stopped the Department of Education came up with a new way of learning which is the Blended Learning Approach, since there are a lot of options to choose from (Modular Learning, Online Learning, etc.). "Blended Learning" was the right word to put it. From time to time the teachers also make sure to visit the learners in their respective homes (following Covid-19 safety protocols) also online communication through video calls are implemented.

The introduction of blended learning (combination of face-to-face and online teaching and learning) initiatives is part of these innovations but its uptake, especially in the developing world faces challenges for it to be an effective innovation in teaching and learning. Blended learning effectiveness has quite a number of underlying factors that pose challenges. One big challenge is about how users can successfully use the technology and ensuring participants' commitment given the individual learner characteristics and encounters with technology (Hofmann, 2014).

As an educator teaching in this pandemic situation, I can say that learning Mathematics subjects is a struggle to the learners because even when classes are conducted face-face, learners still find the subject difficult even if the teachers are already finding ways on how to make the lesson easier for them.

Even if Baybay City Division is implementing the modular distance learning with television as supplement, still majority of the students need guidance in understanding and learning Mathematics. It is because only some of them have the access to the television program where video lessons are played. As a result, teachers do home visitation especially to students who cannot view the video lesson and for those students who are struggling in terms of understanding the lesson in Mathematics.

The researcher really triggers to conduct this study because there are learners that lack literacy skills particularly vocabulary, spelling and comprehension which is probably the main reason why they cannot understand the explanations in the modules. Learners have low scores in

the assessment part of the modules or activity sheets. During home visitation, when learners are asked to recall the previous lesson, they cannot answer. Lessons are not retained in their mind maybe because they don't understand the concept presented in the module.

The researcher is greatly motivated to focus on her study on the effectiveness of Blended Learning Modality to the performance of the Grade 10 students in the delivery on the most essential learning competencies in mathematics towards new level of the teaching and learning process.

This study aimed to determine the Effectiveness of blended learning modality to the Performance of the Grade 10 students in Mathematics enrolled in SY 2021-2022. The findings of the study served as a basis for a proposed Intervention plan.

Specifically, this study sought to answer the following questions.
1. What is the pretest performance of the Grade 10 students in Mathematics before the integration of blended learning modality?
2. What is the posttest performance of the Grade 10 students in Mathematics after the integration of blended learning modality?
3. Is there a significant difference on the pretest and posttest performance of the Grade 10 students in Mathematics before and after the integration blended learning modality?
4. What intervention plan can be proposed based on the findings of the study?

Statement of Null Hypothesis
Ho1.: There is no significant difference on the pretest and posttest performance of the Grade 10 students in Mathematics before and after the integration blended learning modality.

II. Methodology

Design. This study used the quasi-experimental method of research to determine the effectiveness of blended learning modality to the performance of the Grade 10 students in Mathematics. Baybay National High School is the main locale of the study. The twenty Grade 10 students in the aforementioned school are the main respondents of the study and the data is based on the students' performance ratings; in relation to the utilization of the Summative Test Questionnaires were utilized. This research is mainly focused to gather data on: Effectiveness of the Blended Learning Modality; The performance of students during the integration; Recommendation to improve the Intervention Plan; The Proposed Intervention Plan based on the findings of the study.

Sampling. There are 20 Grade 10 students who are included in the study and the primary means of reach is through Facebook account, Messenger, Google Classroom, Cell Numbers of both the parents and or guardians.

Research Procedure. The researcher formulated the following procedures as guide in gathering of data:

The researcher asked permission from the Schools Division Superintendent as well as to the Public School District Supervisor (PSDS) to conduct a research study in the school.

The researcher immediately conducted an orientation to the teachers who conducted the test. The research instrument was administered to the identified respondents. Then the researcher integrated the following instructional materials to deliver the most essential learning competencies such as the Self-Learning Modules, Learners Activity Sheets as well as the video lessons from the DepEd Commons and the validated video lessons from the learning resource section of the Schools Division of Baybay City.

After conducting the pretest, the researcher immediately started the 30-day activities by giving the video lessons which particularly focus on the competencies which is considered the least learned competencies to the identified participants. Then the posttest followed, then gathered and tabulated for specific statistical treatment in order to determine whether the said hypothesis was rejected based on the 0.5 level of significance.

Ethical Issues. The right to conduct the study was strictly adhered through the approval of the principal, approval of the Superintendent of the Division. Orientation of the respondents both the students and the teachers was done separately through virtual orientation for the learners and f2f for the teachers. The need for the secondary data, a written permission was sought to the principal confidentiality and anonymity was discussed requiring them not to write names on the tools.

Treatment of Data. The effectiveness of blended learning modality to the performance of the Grade 10 students in Mathematics was treated through a weighted mean and descriptions (refer to appendices for the scoring and description). t-test for mean difference. This method was used to calculate the significant difference between the pre-test and posttest in Mathematics.

III. Results and Discussion

Table 1
SAMPLE STATISTICS OF THE MATHEMATICS PERFORMANCE OF GRADE 10
STUDENTS BEFORE BLENDED LEARNING MODALITY

Test	Mean	MPS	N	Std. Deviation
Pretest	12.7	31.75	20	4.88

The table 1 above shows the Mathematics performance of the Grade 10 students before the integration of the blended learning approach in selected most essential learning competencies. During the evaluation of the pretest performance of the students, the teacher purely gives modules

to the students in order for them to learn the specific skills for a given period of time in this time of pandemic. Currently Baybay City Division is implementing the Modular Distance Learning Approach based on the DepEd Memorandum no. 162. S. 2020. Based from the results in table 1, it shows that among the twenty (20) respondents of the study from the 40 items test given to them, they gained 12.7 based from the summation of the overall total score divided by the total number of respondents who took the examination. The product of the Mean in the pretest resulted to a Mean Percentage Score which is equal to 31.75. These two (2) results of Mean and Mean Percentage score from the pretest performance of the Grade 10 students with a total number of 20 respondents, resulted to a Standard Deviation equivalent to 4.88.

Based on the result on table 1 on the sample statistics of the Mathematics Performance of Grade 10 students before the integration of Blended Learning Modality on the different Most Essential Learning Competencies. The result implied that the Grade 10 students who took the pre-test in Mathematics before the integration of blended learning are gaining a poor top fair level of performance in Mathematics which resulted to the SD of 4.88 which interpreted as very low performances. Based from the results given, it reveals that the Grade 10 students are currently experiencing difficulties in learning the subject specially Mathematics which is really difficult to understand if it is not taught in a face to face basis where students and teachers can do interaction on the different solutions to the problems being solved or to the skills being emphasized in the lesson or learning competencies. This premise further discusses that learning mathematics in purely utilizing the printed modules in the delivery of the most essential learning competencies could be more difficult on the part of the students as well as to the parents if there will be no actual showing of solutions to the problems introduced by the teachers in the printed modules. Another reason of why the grade 10 students produced a very low performance it's because some of their parents or guardians don't have the capacity to teach or give assistance to their children in learning the different skills in Mathematics subject which could lead the students to have low motivation in learning the subject, thus they will either not answer the modules seriously or not get the correct answers from the activity or worksheet that they answered for a given time.

Moreover, based from the result given in table 1, since majority of the Grade 10 students gained low performance there is a need to introduce another strategy/ies or methods in the delivery of the most essential learning competencies aside from the printed modules that they are currently experiencing right now to test their performance whether the other suggested modular distance learning delivery modality is effective to them particularly in learning Mathematical skills.

Table 2
SAMPLE STATISTICS OF THE MATHEMATICS PERFORMANCE OF GRADE 10 STUDENTS AFTER BLENDED LEARNING MODALITY

Test	Mean	MPS	N	Std. Deviation
Posttest	24.6	61.50	20	3.58

The table 2 above shows the Mathematics performance of the Grade 10 students after the integration of the blended learning approach in selected most essential learning competencies. During the evaluation of the posttest performance of the Grade 10 students, the teacher already integrated the different learning strategies such Giving of video lessons based from the learning competencies for the specific time that it should be delivered. Aside from the video lessons that the teachers were shared to the Grade 10 students, they also shared Radio- based instructions to supplement the given modules to the Grade 10 students in learning the specific skills. Currently Baybay City Division is embracing the radio-based instructions based on the DepEd Memorandum no. 162. S. 2020. Based from the results in table 1, it shows that among the twenty (20) respondents of the study from the 40 items test given to them, they gained 24.6 based from the summation of the overall total score divided by the total number of respondents who took the examination which has a very big leap to the pretest performance of the students. The product of the Mean in the pretest resulted to a Mean Percentage Score which is equal to 61.50. These two (2) results of Mean and Mean Percentage score from the pretest performance of the Grade 10 students with a total number of 20 respondents, resulted to a Standard Deviation equivalent to 3.58

Based on the result on table 1 on the sample statistics of the Mathematics Performance of Grade 10 students after the integration of Blended Learning Modality on the different Most Essential Learning Competencies. The result implied that the Grade 10 students who took the posttest in Mathematics after the integration of blended learning modality in the delivery of the most essential learning competencies, they are gaining a good to very good level of performance in Mathematics which resulted to the SD of 3.58 which interpreted as very good performances. Based from the results given, it reveals that the Grade 10 students are currently enjoying the blended learning which incorporated printed modules, video lessons, real time teaching interaction and radio broadcasting in learning the subject specially Mathematics which is really difficult to understand if it is not taught in a face to face basis where students and teachers can do interaction on the different solutions to the problems being solved or to the skills being emphasized in the lesson or learning competencies. This premise further discusses that learning mathematics in utilizing different approaches in the delivery of the most essential learning competencies help them increase their capacity to solve the problem and improve their skills in learning Mathematics. Another Reason of why the grade 10 students produced a very good learning performances it's because some of their parents or guardians have the capacity or idea based from the video that they have shown and they can already teach or give assistance to their children in learning the different

skills in Mathematics subject which could lead the students to have a high motivation in learning the subject, thus they will be answering the modules or the worksheets seriously for a given time.

Moreover, based from the result given in table 2, since majority of the Grade 10 students gained very good performance they should continually be experiencing the aforementioned strategy/ies or methods in the delivery of the most essential learning competencies aside from the printed modules to test their performances for the different learning competencies that they will be learning for the next quarters in learning Mathematics.

Table 3

PAIRED SAMPLES T-TEST ON THE MATHEMATICS PERFORMANCE OF STUDENTS BEFORE AND AFTER THE BLENDED LEARNING MODALITY

	Paired Differences		t	df	p-value
	MEAN	S.D.			
PRE-POST	-11.85	3.543	-14.956	19	<.001**

**Highly Significant

The Table 3 presents the test of difference between paired samples t-test on the Mathematics Performance of the Grade 10 students before and after the integration of blended learning approach during the teaching and learning process or in the delivery of the different most essential learning competencies in Mathematics subject. Based on the findings found in table 3, the result of the t-test for paired samples indicate that the posttest mean of 24.6 is significantly higher compared to the pretest mean of 12.7 (t= -14.956, df = 19, p-value <.001). Therefore, the null hypothesis which states that there is no significant difference between mean pretest and mean posttest scores of the students is rejected.

The result of this study indicates that the blended learning modality of teaching mathematics could potentially enhance the learning of the Grade 10 students in learning the subject specially those learning competencies which need more attention. The integration or utilization of the blended learning modality is significantly effective in improving the performance level of the Grade 10 students in Mathematics because of the fact that there were a big increase on the result of the pretest and post-test performance of the Grade 10 students in learning the different learning competencies in Mathematics which could really help the students increase their performances and could create active involvement and participation in answering the worksheets of the different learning competencies.

IV. Conclusion

Based from the findings of the study, the blended learning modality in teaching Mathematics could potentially enhance the learning of the students in this subject. Furthermore, integrating video lessons, radio broad at the same time printed materials in the delivery of the most essential learning competencies could improve the performance of the Grade 10 students in Mathematics.

V. Recommendations

1. The proposed improvement plan should be utilized.

2. The School Head should check different instructional materials of the teachers if they integrate blended learning approaches in teaching and learning process not only in Mathematics but also to other subjects taught.

3. As DepEd introduced the different programs in this time of pandemic which were already shared in Secondary level, the School should fully utilize it in instruction and let the students experience in handling it in order for them to learn independently.

4. Teachers should do some serious things in attending virtual trainings as DepEd do their best in order to learn craft different learning approaches for the field to embrace.

5. The teachers should make or develop strategy/ies and to set targets that can further augment in helping the students to increase their performance level.

6. In relation to the abovementioned, the researcher is giving the authority to those future researchers to conduct the same study to verify the usability and significance of the study. Furthermore, the true experimental design (where there is an experimental and control groups) be conducted to assess the effectiveness of the method over other methods of teaching mathematics)

REFERENCES

[1] DepEd Memo No 162 s. 2020. Suggested Strategies in Implementing Distance Learning Delivery Modalities (DLDM

[2] DepEd Order No. 07 s. 2020. Policy Guidelines On The Implementation Of Learning Delivery Modalities For The Formal Education

[3] DepEd Order No. 31 s. 2020. Interem guidelines for Assessment and Grading in Light of the Basic Education Learning Continuity Plan

AUTHOR'S PROFILE

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The author is born on April 28, 1987 at Palo, Leyte, Philippines. She finished her Bachelor of Secondary Education with major in Mathematics, minor in English at Leyte Normal University in Tacloban City, Leyte. She is currently taking up her Masters of Arts in Education major in School Administration and Supervision at Western Leyte College of Ormoc City, Inc., Ormoc City, Leyte.

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As a Grade 9 coach, she got 2nd Place in the Division Oral Team Competition in the 2019 Metrobank-MTAP-Deped Math Challenge (MMC) in Region VIII, Division of Baybay City.