

Face To Face and Blended Learning as Strategy in Teaching Mathematics

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ABSTRACT: This study aimed to determine the effectiveness of Blended Learning in improving the Performance of the grade 2 learners in Mathematics at Otavi Elementary School Division of Sorsogon Province for the School Year 2022-2023.

The quasi experimental method of research was employed in the study. The main instrument that was used is a teacher-made test to gather the needed data. The respondents of the study were the 50 grade 2 pupils that were grouped into control and experimental groups. The data gathered were analyzed and interpreted by the use of appropriate statistical tools and measures.

The findings of the study were: the computed Mean Performance Level (MPL) of the control group in the pre-test in the operations along whole numbers, Ordinal numbers, Money, addition of whole numbers and, addition of money were 42, 44.8, 46.8, 50.4 and 44.4 respectively with an average MPL of 45.68 and were all described as Did Not Meet the Expectations (DNME). On the other hand, the computed Mean Performance Level (MPL) of the experimental group in each of the said topics are 71.2, 34, 47, 52.4 and 36.8 accordingly with an average MPL of 48.58 and were also described as Did Not Meet the Expectations (DNME).

Further, the computed t-values are 1.75, 1.27, 1.18, 0.22 and 0.92 respectively. These values are lesser than the critical value of 2.011 when the degree of freedom is 37 at .05 level of significance. The computed Mean Performance Level (MPL) of the control group in each of the topic are 86.0, 64.4, 86.4, 89.2, and 85.2 respectively with an average MPL of 82.24. Likewise, the computed Mean Performance Level (MPL) of the experimental group in each of the topic are 84.00, 60.40, 80.80, 79.20 and 74.00 accordingly with an average MPL of 75.68. The computed t-values are 0.43, 0.54, 1.50, 1.98 and 1.21 respectively. These values are lesser than the critical value of 2.011 when the degree of freedom is 37 at .05 level of significance.

It can be concluded that the average Mean Performance Level of the pupils in the pre-test on the operations along whole numbers, Ordinal numbers, Money, Addition of whole numbers and Addition of money are below the passing percentage set by the DepEd. There is no significant difference between the performances of the two groups in the pre-test and posttest. The average Mean Performance Level of the pupils of the control group in the post-test is higher than the MPL of the experimental group. Consequently, face to face modality is still effective as a learning strategy for the improvement of the performance of the pupils than the blended learning strategy.

Based from the conclusions, it was recommended that teachers may provide more teaching strategies in mathematics to improve the performance of the pupils. Maximization of the use of blended learning modalities be considered to reach the performance target of the teachers. Both face to face and modular instruction be used by the teachers for them to help the pupils cope with the challenges in learning which are brought by the pandemic. Other mode of instructions other than blended learning be considered and utilized to enhance the learning and teaching strategies and to have positive results in the performance of the pupils. The results of the present study be considered by other researchers in conducting future researches using other topics in Mathematics for grade II.

KEY WORDS: *Blended Learning, Strategy and Mathematics*

I. INTRODUCTION

Blended learning begun as a teaching model due to the advent of COVID 19 which disrupted the educational system globally. Most schools were forced to adopt the said modality or strategy in order for the learners to continue their education.

The occurrence of COVID-19 caused a remarkable change in the worldwide educational system, altering all the ways of instructional delivery. According to UNESCO 81.8% of learners all over the world, at different grade levels, were affected by the total or partial closure of schools. There was a lockdown in some of the schools and were forced to close, that lead to shift teaching from face to face or traditional to online platforms. Nevertheless, as the health situation improved, learners gradually moved back to face-to-face classrooms, and embracing the teaching modality known as blended learning (BL), which combines face-to-face and online learning strategies.

According to Toledo (2022) Blended Learning allowed a partial return to the desired ‘normality,’ respecting the current sanitary measures of social distancing and seating capacity. However, Blended Learning also posed a challenge to the actors involved in the learning process—teachers, students, and institutions—given the infrastructure and organization required to successfully carry it out. Countries like South Korea and France have been forced to close their schools shortly after they re-opened due to spikes in coronavirus cases.

In the Philippines, the government and health officials tried to make adjustments in all areas of concerns not to disrupt the learning and teaching. The Department of Education (DepEd) expend very hard to this transition and the modality of teaching from conventional or traditional to the so-called “blended learning”.

According to Briones (2020) blended learning is not as new as the novel coronavirus in the Philippines. Such a form of learning is already offered in some schools and universities in the country. "Blended learning" or “hybrid learning” from the standpoint of the Department of Education is a fusion of “online distant learning” and “in-person” delivery of printed materials to the homes of the learners through the barangays for those who don’t have internet access and interactive facilities in the comfort of their homes. In localities where this is not possible, the DepEd will use television and radio-based instructions. Radios and televisions across the country will be used to broadcast lessons, materials and instructions to those who don't have access to a computer or the internet.

The objective of the DepEd is to continuously extend quality education to learners in the country by using “blended learning” despite the presence of COVID-19 which is not only acceptable but rather a heroic deed. The most important thing is that to continuously support the learners not to stop in going to their classrooms. However, the DepEd need to closely give attention on how this strategy be most effective in catering the learners. There is a need for the teachers to be trained in using technology which is needed in Blended Learning especially in an on-line platform. They must acquire a basic knowledge and competencies to teach more effectively. Otherwise, this will become a challenge that may be faced by the teachers in some aspects that will affect the effectiveness of online learning.

Moreover, the result of the ENAT in 2002 in Bulan IV District indicates that there is a need to address the difficulties of the pupils in numeracy skills which yielded to an overall mean rating of 40.65. This value is beyond expectations which has an adjectival description of needs major support. This is an implication that an intervention is most likely to be provided to address this concern. Likewise, as observed by the researcher and as a teacher, most of her peers faced challenges in participating in the implementation of the Blended Learning relative to the use of technology in online modality.

In particular, the researcher has personally experienced the struggles and challenges in the implementation of blended learning. Blended learning in the Philippines is still considered new to be used a strategy. However, this growing demand for blended learning possesses problems and challenges that are noteworthy to investigate. Hence, this research.

II. Statement of the Problem

This study aimed to determine the effectiveness of face to face and Blended Learning in teaching Mathematics for Grade 2 Learners at Otavi Elementary School Bulan IV District, Division of Sorsogon Province for the School Year 2022-2023.

Specifically, it sought answers to the following questions:

1. What is the performance of the control and experimental groups in the pre-test along the following topics?
 - a. Whole numbers
 - b. Ordinal numbers
 - c. Money
 - d. Addition of whole numbers
 - e. Addition of money
2. Is there a significant difference between the pre-test result of control and experimental group?
3. What is the performance of the control and experimental groups in the post test?
4. How effective is blended learning in improving the performance of the learners in Mathematics?

III. METHODOLOGY

Research Design

This study aimed to determine the effectiveness of face to face and Blended Learning in teaching Mathematics for Grade 2 Learners at Otavi Elementary School Bulan IV District, Division of Sorsogon Province for the School Year 2022-2023.

The study used the quasi experimental method of research through the pretest and posttest.

The main instrument that was used is a teacher-made test to determine the performance of the respondents in the pretest and posttest. The data gathered were tallied, tabulated and analyzed by the use of appropriate statistical tools and measures such as, frequency count, percentage, mean and the t-test.

The Sample

The key respondents to this study were the Grade 2 students officially enrolled in Otavi Elementary School, the School Year 2022-2023. There are two (2) sections in Grade 2 composed of an average of 38 students per class.

TABLE 1

The Respondents

Groups	Frequency(f)	Percentage (%)
Control Group	25	50
Experimental Group	25	50
Total	50	100

As shown in Table 1, the total number of students who participated in the study were fifty (50). Each group is composed of 25 (50%) respondents with a total of 50 (100%). Names of the respondents were not revealed for to observe ethical considerations in conducting research. This study used the random sampling method in selecting the respondents. The identified 50 students are all enrolled in Grade 2 of Otavi Elementary School this school year, 2022-2023.

In choosing the respondents, the researcher utilized the draw lots technique which includes the two classes in Grade 2. The researcher got the average of grades in Mathematics in these two sections from their respective advisers, arranged it from highest to lowest and remove the outliers to come up with the final 25 sample size in each of the control and experimental groups.

The Instrument

To gather the data needed for the study, the researcher prepared a teacher made test together with the table of specifications. It is a 50 item multiple type of test which was used in the pretest and posttest. The instrument was shown first to her adviser for some comments and suggestions. After which, the researchers seek suggestions and recommendations from the panel of evaluators to better the instrument. Finally, the instrument was readied for administration and subjected for a dry-run.

The dry-run of the test was administered to some learners from other school in the district. After the dry-run, the results were analyzed and found some ambiguous questions to be discarded and replaced. The instrument was then finalized for final administration.

Data Gathering Procedures

In conducting this study, permission was first sought from the school principal of Otavi Elementary School Division of SorsogonBulan IV District, the school where this research was conducted. After the approval, the researcher personally conducted the pretest on November 6, 2022. The two groups of respondents were given instructions on the manner of answering the test. They were given two hours to answer the 50-item multiple-choice test. The test papers and answer sheets were retrieved by the researcher right after the examination and the results were checked, recorded, and made available for statistical analysis and interpretation.

After the pretest, the teacher taught the learners about the most essential learning competencies in Mathematics. On the part of the experimental group, they undergone modular and face to face modalities, while the control group undergone face to face modality only. After all the competencies were discussed, a post-test was then administered to the control and experimental group belongs. The same test was administered to the two groups. The posttest was administered on January 10, 2023. Right after the test, the answers were checked and recorded.

The data gathered were tallied, analyzed, and interpreted with the use of statistical tools to determine the performance level of the learners. The entire duration of the activity lasted for almost 40 school days starting from the pretest to the posttest.

Data Analysis Procedures

The gathered data were treated statistically. These are presented systematically by order of the study's problems. The test results in the pre and post-tests were checked, tallied, analyzed, and interpreted. The researcher adopted the scale from DepEd Order No.8, s. 2015 to determine the performance level and description of the students in the pretest and posttest.

Mean Performance Level (MPL)	Description
96% - 100%	Outstanding
85% - 95%	Very Satisfactory
80% - 84%	Satisfactory
75% - 79%	Fairly Satisfactory
Below 75%	Did Not Meet theExpectations

Consequently, t-test for independent samples was used to determine the difference in the performance of the control and experimental groups in the pretest and posttest.

IV. RESULTS AND DISCUSSIONS

This section presents and discusses about the performance of the control and experimental groups along whole numbers; ordinal numbers; money; addition of whole numbers and; addition of whole numbers (money). Further, the computed MPL and average MPL for each of the groups in the topics given topics are also presented.

1. Performance of the control and experimental groups in the pre-test

It can be gleaned from table 2A that the computed Mean Performance Level (MPL) of the control group in each of the topic are 42, 44.8, 46.8, 50.4 and 44.4 respectively with an average MPL of 45.68 which are all described as *Did Not Meet the Expectations*. On the other hand, the computed Mean Performance Level (MPL) of the experimental group in each of the topic are 71.2, 34, 47, 52.4 and 36.8 accordingly with an average MPL of 48.58 and also described as *Did Not Meet the Expectations*. These results are below the passing percentage set by the DepEd reflected in the grading system.

TABLE 2 : Performance of the Control and experimental groups in the Pre-test

Topics	Control Group	Desc.	Experimental Group	Desc.
	MPL		MPL	
Whole numbers	42.00	DNME	71.20	DNME
Ordinal numbers	44.80	DNME	34.00	DNME
Money	46.80	DNME	47.00	DNME
Addition of whole numbers	50.40	DNME	52.40	DNME
Addition of money	44.40	DNME	36.80	DNME
Overall	45.68	DNME	48.58	DNME

Legend: DNME- Did Not Meet the Expectations

It seems that the MPL of the control group along whole numbers and addition of whole numbers are greater than the MPL of the experimental group. This goes to show that the control group have more prior knowledge along the said topics. This may be attributed that they were more exposed on the topic. In contrast, the experimental group performed better in all the other topics indicated. It can be deduced that pupils in the experimental group were exposed more on the topics over the control group.

Generally, the data may indicate that the pupils they don't have enough prior knowledge regarding the topics especially in the operations regarding whole numbers and ordinal numbers in the part of the control group; more so, ordinal numbers and addition of whole numbers in the part of the experimental group. Furthermore, the topics may have not yet fully introduced in the lessons before the implementation of the blended learning. Some pupils may have difficulties as far as operations of numbers, may be because mathematics is not the subject they love most. It can be inferred that with the given data, there is a need to use effective strategies for the pupils to perform well and achieve higher performance in the operations of the given topics.

2. Difference between the pre-test result of control and experimental group.

Table 3 presents the computations of the difference between the pre-test results of the two groups of respondents in the indicated topics. It is presented in the table that the computed t-values are 1.75, 1.27, 1.18, 0.22 and 0.92 respectively. These values are lesser than the critical value of 2.011 when the degree of freedom is 37 at .05 level of significance. Thus the hypothesis is not rejected, and therefore there is no significant difference between performances of the two groups in the pre-test. This means that regardless of the teaching strategies being used by the teachers, the two groups have almost similar or equal performances as far as their gained MPL for each of the topics are concerned. The pupils in each group performed with homogeneity in all of the operations in the following topics.

TABLE 3 : Difference between the Pre-test Results of the Control and Experimental Groups

Statistical Bases	Whole numbers	Ordinal numbers	Money	Addition of whole numbers	Addition of money
Computed t-value	1.75	1.27	1.18	0.22	0.92
Decision on Ho	Reject	Reject	Reject	Reject	Reject
Conclusion	Not Sig.	Not Sig.	Not Sig.	Not Sig.	Not Sig.

Legend: $\alpha=0.05$ $df= 37$ Critical Value = 2.011 Sig.-Significant

This is an implication that learning modalities may be applied and tested in order to determine whether it can be more effective than the previous ones. It may also be deduced that some factor like, review of the curriculum, problems encountered in mathematics, family background, learning environment and other student and school related factors may be considered as basis for determining the most effective learning modality.

3.Performance of the Control and Experimental groups in the Post-test

Table 4 shows the computed Mean Performance Level (MPL) of the control group in each of the topic are 86.0, 64.4, 86.4, 89.2, and 85.2 respectively with an average MPL of 82.24. Likewise, the computed Mean Performance Level (MPL) of the experimental group in each of the topic are 84.00, 60.40, 80.80, 79.20 and 74.00 accordingly with an average MPL of 75.68. Most of the results are considered passing in the grading system of the DepEd.

TABLE 4 : Performance of the Control and experimental groups in the Post-test

Topics	Control Group	Desc.	Experimental Group	Desc.
	MPL		MPL	
Whole numbers	86.00	VS	84.00	S
Ordinal numbers	64.80	DNME	60.40	DNME
Money	86.40	VS	80.80	S
Addition of whole numbers	89.20	VS	79.20	FS
Addition of money	85.20	VS	74.00	DNME
Overall	82.24	S	75.68	FS

Legend: S-Satisfactory VS- Very Satisfactory FS-Fairly satisfactory
DNME- Did not Meet the Expectations

The results may mean that the blended learning modalities used may be considered as effective. Both groups performed well after they undergone the face to face and modular learning. However, pupils in the control group who were exposed to face to face modality performed better than the experimental group who were given the intervention of face to face and modular learning.

By close analysis, the achievement of the control group when they undergone the traditional method or face to face is an evidence that the pupils learn more in the traditional way of learning. They can perform better and can grasp the lessons well in the said modality. This is an indication that the teacher may have been better teachers with respect to the kind of teaching modality in which they may have been trained well ever since the start of their teaching.

It implies that appropriate learning modalities can be of great help for the pupils to learn effectively even they are facing challenges and problems on blended learning. Active participation on the part of the pupils, parents and the full support in the education sector may contribute to have a more positive learning performances.

4. Effectiveness is blended learning in improving the performance of the learners in Mathematics?

It is indicated in table 5 the computations of the difference between the post-test results of the two groups of respondents in the following topics. The results present the effectiveness of the blended learning in teaching mathematics. It is revealed in the table that the computed t-values are 0.43, 0.54, 1.50, 1.98 and 1.21 respectively. These values are lesser than the critical value of 2.011 when the degree of freedom is 37 at .05 level of significance. Thus the hypothesis is not rejected, and therefore there is no significant difference between the performances of the two groups in the post-test.

The data presented may give some connotations that the pupils in both groups can learn and adapt the learning modalities used in teaching the subject relative to the topics. It may also generate some inferences that the performance levels of the two groups can be paired to have similar mean performance levels. Another thing is that the teachers may have been considered the settings of the learning situations during the pandemic.

TABLE 5 : Difference between the Posttest Results of the Control and Experimental Groups

Statistical Bases	Whole numbers	Ordinal numbers	Money	Addition of whole numbers	Addition of money
Computed t-value	0.43	0.54	1.50	1.98	1.21
Decision on Ho	Reject	Reject	Reject	Reject	Reject
Conclusion	Not Sig.	Not Sig.	Not Sig.	Not Sig.	Not Sig.

Legend: $\alpha=0.05$ $df= 37$ Critical Value = 2.011 Sig.- Significant

It implies that regardless of the modalities being used, the control and experimental groups can both perform well on the said topics. It seems that the two groups of respondents were given of what they really need to adapt the modalities and can do better as far as the teaching of the lessons are concerned not to mention their background in the said topics. This may conclude that blended learning can be considered as one effective learning modality to be use in teaching.

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