

Utilization of Video Lessons as Mathematics Intervention Material in Modular Distance Learning

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Abstract — *Distance learning is commonly used, especially since most countries are coping with a pandemic. As a result, it is critical to consider ways to ensure that teachers' and learners' teaching and learning processes run smoothly. Despite teachers' best efforts during the previous grading period, some learners got Learning Outcome Assessments (LOA) that fell short of the expected performance level of 75%. Therefore, teachers created video lessons to address the issue and used them as intervention material. This study assessed video lessons as mathematics intervention material for 105 struggling grade 10 students at Pililla National High School's Modular Distance Learning Modality. For the two quarters covered by the intervention, the Grade 10 respondents received mean scores of 8.39 and 11.04 on the pretest. The authors used video lessons to address the learners' requirements. The study's findings suggested that learners' performance improved before and after video lessons, as evidenced by the posttest examination. However, the pretest and posttest findings in the two quarters varied significantly. This implies that video lessons as intervention material for modular distance learning can help learners improve their mathematical understanding and performance. Using this material helped learners perform better academically. The video lessons directed learners through coping with the tasks presented to them as part of their module, and they gained confidence in answering them. Learners also learned to devise approaches to mathematical problems incorporated into the module activities. This indicates that learners were more willing to watch videos to achieve better grades in class.*

Indexed Terms — *Distance Learning, Intervention, Mathematics, Video Lessons*

I. INTRODUCTION

Most countries have temporarily closed educational institutions to avoid the virus's spread and illnesses caused by COVID-19. The face-to-face involvement of learners and teachers has also been suspended within the school. The Philippines has adopted the new normal type of education, and teachers' constant innovations and active participation from other stakeholders have been the driving factor behind its success. The Department of Education developed Modular Distance learning to ensure educational continuity and for each school to continue to fulfill its mission and vision of providing quality education to every Filipino learner.

Modular learning is the most commonly used type of distance learning. All public schools in the Philippines currently use this learning method. According to a Department of Education (DepEd) survey, learning through printed and digital modules is the most preferred distance learning method among parents with children enrolled this academic year [1]. The teacher can assist the learners via text, email, call, or instant messaging platforms in this modality. However, the teacher's immediate response is not always possible due to an unstable internet connection. Teachers will visit learners who require remediation and assistance at home whenever possible.

Learners are encouraged to conduct independent work through modules. However, most learners are unable to study independently [2]. They struggle to follow the instructions stated in the modules, and topics are challenging to grasp without the help of teachers. As a result, the learners' outputs from the modules' activities were late and mostly incomplete. Furthermore, learners require constant motivation and reinforcement from teachers to pursue self-learning. It

signifies that learners cannot study independently and require extensive teacher assistance.

It is proper to aid learners in overcoming the problems of this pandemic by working with teachers to devise innovative ways to teach them and pushing the Department of Education's mission to ensure that no child is left behind. To overcome these issues, the teacher should provide suitable interventions for struggling learners, such as providing consistent consultation via call, text, and social media platforms, simplifying the module and providing instant feedback on the student's outputs. Because of information and communications technology, virtual classrooms, web-based access to lab computers, virtual dialogues, and other forms of teacher-student engagement are all possible.

Using ICT and gadgets is the most feasible because most students have access to them, and limited face-to-face interaction is permitted. Teachers should assist in using available resources based on the learners' educational needs. Authors believed the module could not explain mathematical concepts and develop learners' academic achievement. Furthermore, there have been only a few experimental attempts to use this approach to support learners develop their learning to this point. As a result, this study about video lessons as mathematical intervention material will undertake a comprehensive inquiry that might provide a solid platform for teaching content to learners with and without learning difficulties and teachers' teaching strategies.

II. INNOVATION, INTERVENTION AND STRATEGY

Students smartphones and portable devices have spread rapidly around the globe [3], [4]. As a result, various online applications that learners can utilize to learn school subjects overwhelm them. However, locating appropriate online resources to choose the best compatible learning materials given in school is a challenge for them. To solve this, the teacher may develop a personalized lesson in videos or digital materials to utilize as a setting for face-to-face discussion, mainly when distance learning happens.

Video has long been a valuable teaching tool that has improved learning. Today, we are at the vanguard of a shift toward more extensive use of video in the classroom. A video represents moving images supplemented by voice or sound to enhance the overall impression, which is then combined into a single unit in the form of a plot. It has a message with a specific goal in mind [5]. Both teachers and students are using video to enhance their learning. For the foreseeable future, the video will be more used.

Both students and teachers gain from videos in teaching and learning. In Mathematics, using video lessons enables more efficient processing and memory recall. Video's visual and auditory characteristics allow each user to interpret information uniquely. Students may be more motivated to create a unique environment for their learning if they have access to the video. The asynchronous nature of videos allows learners with others at any day or night. Video lesson is an excellent option for students who cannot attend school in person due to the pandemic.

During this pandemic, Pililla National High School continues following the modality that caters to the learner's need and capacity to handle and study various learning competencies for the School Year 2021-2022. Teachers were observed and evaluated the student's performance over the first two quarters of the school year using various approaches. It was discovered that, even though teachers gave their best during the previous grading period, some students received Learning Outcome Assessments (LOA) below the desired performance level of 75%. According to the authors' initial survey, some students became bored while answering the modules. Some did not answer the modules completely, implying that some tasks were left blank and sent to their subject teacher.

This study utilized video lessons as Mathematics intervention material for struggling grade 10 learners under the modular distance learning delivery modality. This study also looks at the performance of Grade 10 students who used video lessons and how it can help them improve their math skills now that they are not in school.

The study claim that video lessons assist teachers in increasing learner motivation, enhancing learner

knowledge and understanding of the topic, and improving learner achievement. Some students perceive mathematics as difficult, even frightening [6]. As a result, students frequently regard it as a boring subject. Because the lesson takes significant concentration from learners as it relates to numbers, symbols, and formulas, the usage of video lessons in teaching mathematics is deemed very relevant and helpful in generating critical thinking and learner motivation, especially during this pandemic.

III. RESEARCH QUESTIONS

The primary purpose of this study is to assess the use of video lessons as intervention materials for struggling learners under the modular distance learning delivery modality. However, for its actualization, the following questions were sought to answer:

1. What are the mean scores of the learners in the pretest and posttest examination concerning:
 - 1.1. Quarter 2: Geometry; and
 - 1.2. Quarter 3: Statistics and Probability?
2. Is there a significant difference between the mean scores of the pretest and posttest concerning the above-mentioned quarters and topics?
3. How do teacher-made video lessons assist students in better understanding mathematics lessons?

IV. METHODOLOGY

A. Participants and/or other Sources of Data and Information

The authors used a technique known as purposive sampling. The participants came from different sections of Grade 10, a total of 105 learners with the least mastered learning competencies from the second and third grading periods. Because of a modular distance learning modality in which learners learn independently with less teacher assistance, these learners failed in mathematics. They did not perform well in the written and performance tasks, as evidenced by their reported results. Many of them received poor grades or failed to submit assignments. As a result, the teachers created video lessons to assist them in developing the desired learning skills. It seems that self-paced learning using modules was insufficient. Teacher interventions should ensure that the students understand the mathematical lesson.

Teachers developed video lessons to address the problem, allowing students to continue learning even at home.

B. Data Gathering Methods

The authors expertly crafted the study's research design and tools. As part of the protocol, permission from the school head was obtained by writing a formal letter signed by the Mathematics department chairperson. After granting approval, learners and parents were given a face-to-face orientation to explain the study's procedures. Following that, an initial survey was conducted to evaluate the learners' challenges in modular learning and their technological capabilities in device ownership to prioritize considerations and changes. A 40-item pretest was also administered for each quarter. The teachers collected the results, and the initial survey was analyzed immediately.

The authors suggested possible interventions based on the availability of resources, students' technological capabilities, the module's content, the essential learning competencies, and the nature of learners. They created a program for developing and implementing interventions. Video lessons, follow-up tasks, and surveys were all used as interventions. Because the participants were minors aged 14 to 16, the authors sent the consent form to the learners during the module distribution before the implementation stage. The learners' voluntary participation was considered when they were chosen as participants.

The intervention would last in the third and fourth quarters. The mathematics teachers kept track of video consumption through home visits and other follow-up modes. The learners were provided instructions for the follow-up activities and were required to complete them as proof of having consumed the intervention. The authors administered a posttest examination to assess the learners' understanding after the time limit had passed.

The researchers would compare the pretest and posttest scores to see if there was a significant difference in the learners' learning levels. Surveys were conducted to determine how teacher-made video lessons help learners understand the different lessons

in mathematics. Random interviews were conducted to verify and clarify the student's responses to the survey.

The researchers would compare the pretest and posttest scores to determine if the learners' learning levels differed significantly. In addition, surveys were undertaken to see how well teacher-made video lessons help students understand various mathematics lessons. Finally, random interviews were conducted to verify and clarify the learners' responses to the survey.

V. RESULTS AND REFLECTION

This section includes a discussion of the study's findings and a reflection. The information offered in this section is organized according to the problems listed in the Research Questions. The collected data and the results of the pretest and posttest were assessed and analyzed after the examination was administered and completed.

Problem 1: What are the mean scores of the learners in the pretest and posttest examination?

TABLE 1: Computed Mean Scores and Standard Deviation of the Learners in the Pretest and Posttest Examination

Quarter	Pretest			Posttest			MD
	\bar{x}	V I	Std.	\bar{x}	V I	Std.	
Q ₂	8.39	F	1.55	22.58	S	2.61	-14.19
Q ₃	11.04	F	1.98	25.01	V S	2.95	-13.97

Table 1 shows the learners' computed mean scores and standard deviation in the pretest and posttest examinations.

In quarter two, which is all about Geometry, respondents got an 8.39 mean score with the verbal interpretation of "Fair" and a standard deviation of 1.55 for the pretest. For quarter 3: Statistics and Probability, the respondents, got an 11.04 mean score with the verbal interpretation of "Fair" and a standard deviation of 1.98 on the same type of test. The result implied that the learners found difficulties in understanding learning competencies because the mean scores in quarters 2 and 3 are below the norms

of scores stipulated in the DepEd policies, which is 75% out of the total number of items given to them.

On the other hand, the posttest result for quarter 2 gives a 22.58 mean score with the verbal interpretation of "Satisfactory" and a standard deviation of 2.61. Finally, the development of quarter 3 revealed a mean score of 25.01 with the verbal interpretation of "Very Satisfactory" and a standard deviation of 2.95.

Moreover, considering the mean difference, quarter 2 got the highest increment from pretest to posttest results. The negative result means the posttest scores are higher than the pretest, which is the manifestation of a good result of the intervention. It tells the strength of utilizing video lessons in mathematics intervention. This justifies the cause of score increment was due to intervention.

This implies that utilizing video lessons as intervention material for modular distance learning can help students increase their understanding and performance in mathematics, similar to the study of [7].

Problem 2: Is there a significant difference between the mean scores of the pretest and posttest with respect to the above mentioned quarters/ topics?

TABLE 2: Computed t-test on the Pretest and Posttest Results of the Respondents

Quarter	MD	df	t	p-value	H ₀
Q2	-14.19	104	-64.83	0.00	Reject
Q3	-13.97	104	-72.90	0.00	Reject

Table 2 shows a significant difference between the pretest and the posttest mean scores. The p-value is lower than the 0.05 significance level at the degree of freedom of 104. It implies that utilizing video lessons in mathematics intervention helped the learners to perform better academically. Since the teacher explained the lesson content in the video lessons, the learners had significant learning improvement from the test result, similar to Ladrillo's [8] findings. Furthermore, it implies that teacher-made videos can

deliver lessons and activities that help the learners understand the mathematics concepts.

Moreover, videos empower learners to watch their lessons under their control. They can replay or pause anywhere and anytime as long as they have devices, even with or without internet connections [9].

Problem 3: How do teacher-made video lessons assist students in better understanding mathematics lessons?

Videos for Distance Learning

Distance learning is widely used in industry, particularly now when most countries are dealing with a pandemic. Therefore, it is essential to think about strategies to keep the teaching and learning process between teachers and students working smoothly. The utilization of video lessons for learners in dealing with this challenge is a huge thing to help with their learning needs.

For some learners, using videos as instructional aids is a unique experience. Students can go anywhere with video lessons. Students can feel as though they are in or participating in the environment described by watching the video.

Videos as Tools for Learning Mathematics

Learners could grasp the mathematics lesson through video lessons because their teachers explained the content using the Filipino and English languages. Learners can also improve their visualizing abilities by watching video lessons. Watching requires obtaining and combining information from numerous audio and visual sources. With these video lessons, learners understand the things they are having difficulty with because they can watch the process. This is particularly true for the mathematical computations that no one may be teaching at home.

According to Kahrmann [10], videos are suitable supplementary instructional materials that improve students' learning experiences in developing school learning competencies. He found that technology has opened new doors for educators to provide the modelling and assistance students and parents need outside of the classroom. For example, learners were guided by the video lessons on dealing with the tasks assigned to them from their module; they gained

confidence in answering them. They also devised methods for dealing with mathematical difficulties incorporated into the module activities. This suggests that students were more likely to watch video lessons to get positive results in the class.

Furthermore, according to Nugent [11], video is a medium that is appropriate for a variety of learning sciences, including classes, small groups, and even one learner alone. Additionally, video lessons as digital interventions assisted learners in acquiring secondary mathematics competencies [12]. These also improve proficiency and digital literacy, which are critical in today's world.

CONCLUSION

Based on the results, this study indicates that using Video Lessons as intervention material in teaching the learning competencies in Mathematics could potentially enhance the skills and performance of the Grade 10 students in distance learning.

REFERENCES

- [1] J. Bernardo, "Modular Learning most preferred parents: DepEd. ABS-CBN News," ed, 2020.
- [2] Y. R. P. Dangle and J. Sumaoang, "The implementation of modular distance learning in the Philippine secondary public schools," in *3rd International Conference on Advanced Research in Teaching and Education*, 2020, p. 108.
- [3] J. S. Ranga, "Customized Videos on a YouTube Channel: A Beyond the Classroom Teaching and Learning Platform for General Chemistry Courses," *Journal of Chemical Education*, vol. 94, pp. 867-872, 2017/07/11 2017.
- [4] L. Silver, "Smartphone ownership is growing rapidly around the world, but not always equally," 2019.
- [5] N. Rauf and U. Fauziah, "The Use of Mathematics Learning Video During the Pandemic Covid-19 at SMA Datuk Ribandang Makassar," in *International Conference on Educational Studies in Mathematics (ICoESM 2021)*, 2021, pp. 363-367.
- [6] B. R. Acharya, "Factors Affecting Difficulties in Learning Mathematics by Mathematics

- Learners," *International Journal of Elementary Education*, vol. 6, pp. 8-15, 2017.
- [7] O. N. Lalian, "The Effects of Using Video Media in Mathematics Learning on Students' Cognitive and Affective Aspects," *AIP Conference Proceedings*, vol. 2019, p. 030011, 2018.
- [8] S. Ladrillo, *Effects of Teacher-Made Learning Videos on Students' Academic Performance among Grade 9 Mathematics under Modular Approach*, 2021.
- [9] P. K. P. Palanisamy, and D. Saravanakumar, "Effectiveness of Video Assisted Learning Module," *International Journal of Control and Automation*, vol. 12, pp. 268-275, 12/12 2019.
- [10] C. R. Kahrman, "Efficacy of Math Video Tutorials on Student Perception and Achievement," 2016.
- [11] C. Widahyu, "The Effectiveness of Using Video as a Learning Media Online Learning to Improve Students' Learning Motivation and Creative Thinking at Home During the Covid-19 Pandemic " 01/07 2021.
- [12] C. Bokhove and P. Drijvers, "Effects of a Digital Intervention on the Development of Algebraic Expertise," *Computers & Education*, vol. 58, pp. 197-208, 2012.