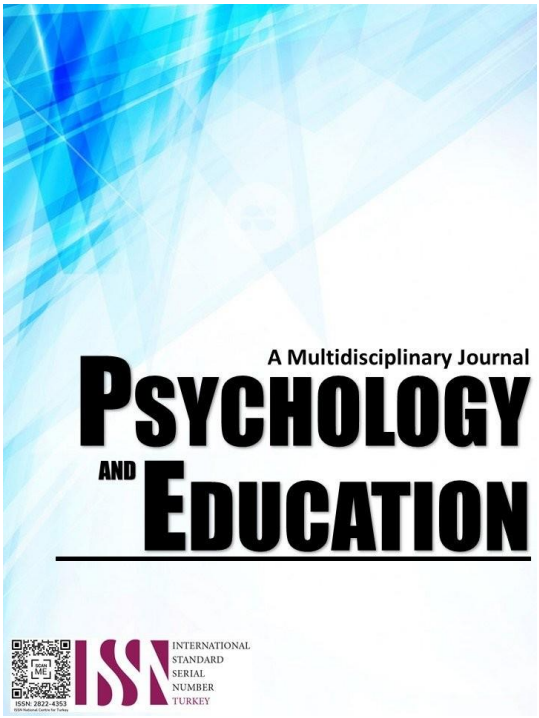
VIDEO–RECORDED LESSONS: ITS EFFECT TO THE MATHEMATICS PERFORMANCE OF LEARNERS



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Research Article

Video–Recorded Lessons: Its Effect to the Mathematics Performance of Learners

Lyneth D. Lamit,* Mary June P. Panizales
For affiliations and correspondence, see the last page.

Abstract

This Quasi – Experimental Research Design was conducted to determine the effects of video–recorded lessons to the Mathematics performance of learners. The subjects of the study were 60 Grade 9 learners enrolled in a Public High School in the District of Passi City for school year 2022 – 2023. Thirty (30) learners were assigned to the experimental group and 30 learners to the controlled group with the used of Matched-Pair Design. The instruments used to gather data were the adopted quality-assured Video–Recorded Lessons. The researchers' constructed the pre-test and post-test performance test to evaluate the Mathematics Performance of the respondents. The descriptive statistical tests employed were frequency, mean and standard deviation. For inferential test, independent sample t-test was employed and was set at $\alpha = 0.05$. The findings revealed that the level of the Mathematics performance of both groups in the pretest is "Fairly Satisfactory" and in the posttest both groups were "Satisfactory". No significant difference was noted in the Mathematics performance of learners in the pretest of both groups. There is a significant difference in the Mathematics performance of learners in their pretest and posttest. Moreover, significant differences were found in the Mathematics performance of learners in both groups in their posttest scores and at the same time in their mean gain score. The researcher recommends the utilization of the adopted quality-assured Video–Recorded Lessons in Mathematics classroom instructions.

Keywords: *Video-Recorded Lessons, Traditional Teaching Method, Mathematics performance, Quasi-Experimental*

Introduction

Teachers play an essential role in teaching and learning, delivering quality education and accountability for the learners' overall growth. They have just confronted with the drastic changes to the shifts in schooling brought about by the COVID-19 epidemic, which began in 2019 up to present.

According to DepEd Secretary Leonor Magtolis Briones (2020) "Education must continue amidst this COVID – 19 pandemic and that no learners must be left behind". The DepEd's Plan for Continuity of Learning (LCP) developed the concept of blended learning to standardize educational activities by utilizing two or more methods that may match each learner's needs according to their demographic profile.

Efraim M. Santibañez National High School adapted the Modular and TV-Radio Based Instruction delivery modes. Based on the previous School Years (2020 – 2021 and 2021 – 2022) of the Print Module Distribution and retrieval, a myriad of issues had observed among students who chose Printed Learning Modules as their learning modality, including copying answers from the answer key and losing interest in their study due to various reasons, poor retention of prior knowledge, unable to answer the performance tasks, and poor performance in answering the summative assessment stated in the Printed Modules.

Schools Division Superintendent of the Schools Division of Passi City, Engr. Jesse M. Gomez, PhD, CEO, CESO V, created a learning initiative in response to the unavailability of TV stations and internet connections. This learning initiative is the production of video – recorded lessons in every subject area per grade level.

To address the learning gaps and to continue delivering quality education amidst this pandemic, the researcher wanted to investigate the effect of video-recorded lessons in the mathematics performance of Grade 9 learners enrolled at Efraim M. Santibañez National High School for the academic year 2022 – 2023.

Research Questions

Generally, the study sought to investigate the effects of using Video–Recorded Lessons in the Mathematics Performance of Grade 9 learners enrolled at Efraim M. Santibañez National High School for the school year 2022 – 2023. Specifically, this study aimed to answer the following questions:

1. What is the level of Mathematics performance of the experimental and controlled group in the pretest and posttest?
2. Is there a significant difference in the Mathematics performance of learners in the pretest of the experimental and controlled group?
3. Is there a significant difference in the Mathematics performance of learners in the pretest and posttest of the experimental group?
4. Is there a significant difference in the Mathematics performance of learners in the pretest and posttest of the controlled group?
5. Is there a significant difference in the Mathematics performance of learners in the posttest of the experimental and controlled group?

6. Is there a significant difference in the mean gain score of learners in the experimental and controlled groups?

Literature Review

This study aimed to determine the effects of Video–Recorded Lessons in the Mathematics Performance of Grade 9 Learners. To add more information about this study, the researcher reviewed some related literatures to have better and clearer understanding of what the study was all about.

Video Lessons

Video lesson is a lesson that contains an educational video on a specific topic. It aids in the dynamic and engaging presentation of knowledge by educators. Visual content plays a significant role in education. According to (Statistics, 2023), 65% of the population are visual learners, which means that these learners remember and learn information better through videos, images, infographics, unique apps, and websites (Send Pulse, 2023).

According to Edutopia (2019), new teachers frequently need help identifying curriculum enhancement methods. Learners who want to learn the material more often find video tutorials excellent assistance. Reading, sketching, and watching visual modalities are some of the multimedia modalities that learners learn best from.

Moreover, video has become an essential part of higher education. According to Perez (2016), it is incorporated into traditional courses, acts as the foundation for it is typically the primary mode of online course distribution, and was used in many blended courses.

Learning Videos as an Instructional Material in Mathematics

The concept of learning videos as an intervention to teach is not just technology integration but a new trend adaptation for "Net" generations. Pre-recorded videos might be helpful in the classroom for teaching and learning. It promotes a variety of instructional approaches that provide learners the chance to be independent learners.

According to Rasi and Polkela (2016), students increasingly desire to govern their learning more freely and build a tailored learning environment both within and outside the classroom. Using cell phones to watch videos helps teach learners appropriate techniques and enhances learning results. Additionally, it can result in a noticeably better desire for learning, assurance that one will master a skill, and class satisfaction (Lee et al., 2016).

According to Brame (2016), using video as a learning tool would convey essential concepts and ideas, increase students' engagement, and contain guided questions and homework assignments. Watching videos is beneficial for gaining specific skills, changing attitudes, encouraging cognitive learning, and retaining knowledge (Taslibeyaz et al., 2017).

The ability to study at any time or place is the context of "ubiquitous learning," which has been tremendously helped by the development of the video. The availability of the content may be tailored to the needs of each student, and it offers a flexible, cost-effective, and location–free form of flexible learning. These were seen as real advantages for students who get video-based training, Taslibeyaz et al., (2017).

According to Marshall, as stated in Cruse (n.d.), the average recall rate for information is 10% for reading, 20% for hearing, 30% for seeing, and 50% for both hearing and seeing. In addition, in the study of Islam (2020), he discovered that video recordings were chosen over online sessions owing to their adaptability, ease, and educational efficacy in the most current studies.

According to Capuno et al. (2019), it might be difficult for math teachers to bridge the achievement gap and maintain learning so that learners acquire fundamental arithmetic abilities. Teachers now have more resources at their fingertips in the classroom to assist learners in understanding mathematical ideas. Combining classic and contemporary teaching strategies can benefit learners of all skill levels, especially given that the subject is challenging.

While viewing may appear passive, Mayer (2016) explains that viewing can involve the high cognitive activity necessary for active learning.

Therefore, the researcher believes that including real, carefully structured learning videos in the delivery of the instruction would be the most helpful tool for educators and learners in mathematics.

Learners' Mathematics Performance

The trends in International Mathematics and Science 2019 findings show that Filipino students underperformed compared to students from other countries on the International Assessment for Mathematics and Science for Grade 4. According to Narad and Abdullah, any academic institution's academic success or failure is determined by the student's academic performance, as mentioned in Abaidoo (2018). They concluded by saying that academic performance is the information acquired and assessed by the educator over a certain period. He further concluded that a learner's motivation is crucial to their success in the classroom. The motivating traits of learners, such as self-examination, altruism, career concentration, and social pressure management, were described as having a good effect on academic achievement.

Tety (2016) also emphasized the influence of instructional materials on student academic achievement. Additionally, he discovered that in Nigeria, pupils taught using instructional materials do better than those who do not. Similarly, Krukru, as described in Abaidoo (2018), discovered that instructional materials significantly affect academic achievement in Nigeria. He argued that using teaching aids makes it easier to deliver lessons on time and improves teaching and learning.

Moreover, in the study of Dopico, et.,al (2022) titled "Gender Similarities in the Mathematical Performance of Children," indicated the irrelevance or non – existence of gender differences in their mathematics performance.

Effects of Video Lessons on the Mathematics Performance of Learners

According to Abaidoo (2018), for students to succeed academically, they must be interested in the topic, have a regular study routine, have a high attendance record, and be self-motivated. Reiterated that teacher factor significantly affects learners' academic achievement, including teacher teaching experience, the completion of the course, and identifying and addressing weak areas of the learning, assignments, assessment of the learning, efficacy of the teacher, and student-centered method of teaching, professional training, teacher to student ratio and qualification of teachers. J. Jeremias et al. (2022) conducted a study entitled "Effectiveness of Video Lessons in Improving the Performance of Students in Mathematics." They examined the effectiveness of video lessons in improving students' performance in Mathematics 8. The descriptive-developmental technique was used in the investigation. According to the study, video lessons were helpful in all classroom areas and may be used by teachers to set aside time and space for active learning. Their study suggested that video lessons can be developed and utilized to improve the performance level of the students in Mathematics.

Another study by Baer (2021), "Effects of Using Video Lessons in the Mathematics Achievement of Senior High School," investigated how San Jose City National High School students fared in mathematics after watching video lessons. The study examined two comparative learning groups using an experimental research method. The experimental group got teaching through watching YouTube videos, whereas the control group received instruction using the conventional method.

Based on the findings, experimental groups instructed utilizing video courses did noticeably better on the post-test than those instructed using the traditional approach. Findings suggested that watching video lessons from YouTube is effective and can be a possible approach to improving the mathematics performance of SHS learners. Moreover, the study Beltran (2021) entitled "Effectiveness of Modular and Video Lessons in Mathematics Performance to The Performance of Grade 5 Pupils" determined the impact of self-learning modules and video lessons on the mathematics performance of Grade 5 pupils. The study used the Quasi–Experimental method, and the researcher utilized universal Sampling to select the study's respondents. This study's result implied that integrating Self-learning modules and video lessons in teaching mathematics on the different Most Essential Leaning Competencies could potentially enhance the mathematics performance of Grade 5 pupils. Although little research examines explicitly how well video lessons affect students' arithmetic ability, these studies frequently use strategies that measure the overall success of the videos. Moreover, in the study by Marwa (2020) entitled "Using video-based tasks to improve mathematical practice and support teachers' Students' fruitful struggle with math learning in the Faculty of Education. The research's conclusions showed how well video-based activities may enhance mathematical practices and aid student instructors in the Faculty of Education in their fruitful fight. It was advised that consideration be given to effective mathematical teaching methods and worldwide standards for mathematical activities.

Additionally, paying attention to using video-based assignments and integrating them into the curriculum is essential.

Traditional Method of Teaching

According to Stephen Purse (2017), the traditional way of delivering instruction, commonly called conventional or back-to-basics education, is still frequently employed in educational institutions. Traditional methods of instruction ensured that students were rewarded for their achievements, that class time was used effectively, and that there were clear regulations in place to control students' conduct.

According to Foroun (2022), learning by memorization and recitation approaches does foster students' critical thinking, problem-solving, or decision-making skills.

Moreover, in the study of Alghazo (2019) titled "Effectiveness of Traditional Method of Teaching in Academic Performance of GAS," showed that using the traditional method of teaching, the students could understand their lesson. Likewise, students could present their work based on the discussion.

Methodology

Research Design

This study aimed to investigate the effects of video–recorded lessons on the mathematics performance of Grade 9 learners. Thus, the most appropriate research design used in this study is a Quasi-Experimental research design.

Thomas (2022) states that Quasi–Experimental design aims to establish a cause-and-effect relationship between independent and dependent variables.

This Quasi-Experimental research was designed to determine the effects of video–recorded lessons on the mathematics performance of Grade 9 learners, and the sample investigated involved two groups: the experimental and controlled group.

The experimental group was exposed to 1-hour quality-assured video–recorded lessons facilitated by a teacher, while the control group was exposed to the traditional teaching method.

Respondents

The subjects of the study were the Grade 9 learners of Efraim M. Santibañez National High School, Brgy. Sto. Tomas, Passi City, Iloilo. Out of 150 population of Grade 9, sixty (60) of which were selected using Matched-Pair Design for the purpose of the present study.

Matched-Pair Design is an experimental design where pairs of participants are matched regarding key variables (simplypsychology.org, 2022).

The key variables used in selecting the subjects were age and first-quarter Mathematics grades. A total of sixty (60) students were involved. Thirty (30) learners were assigned to the experimental group and thirty (30) learners to the control group.

Instrument

To collect the required data, the following instruments were employed in this study:

Video–Recorded Lessons. The adopted quality-assured instrument from the Schools Division of Passi City initiated by Engr. Jesse M. Gomez, PhD, CEO, CESO V was one (1) hour video–recorded lesson wherein a teacher discussed the lesson. Learning Activities and lessons were patterned from the Most Essential Learning Competencies (MELCs) issued by the central office.

Video–Recorded Lessons used in this study were the nine (9) recorded videos intended for the second quarter, which covered topics on variations and radicals. The specific topic for each video can be seen in Appendix M (Content of Video–Recorded Lessons per week), page 92.

Researcher–made Performance Test. This constructed performance test is a 30-item test that covers topics on variations and radicals. Prior to the implementation of the study, the researcher asked the help of the experts to evaluate the instrument and gathered their suggestions for the refinement of the research instrument.

The researcher–made performance test was validated using indicators. Pilot testing was conducted among Grade 9 learners to test the instrument's reliability. The research instrument was subjected to a reliability test using KR20 and item analysis. Hence the result of the reliability test is excellent with $\alpha \geq 0.9$, it showed that the research instrument was reliable and was used in the actual conduct of the study.

Procedure

Permission to conduct was sought from the Division Superintendent, Division of Iloilo. Upon approval of the permit to conduct the study, the researcher immediately scheduled the distribution of the researcher instrument via google form through the help of the Division Senior High School Coordinator. The Division Senior High School Coordinator sent the google link to the group chat of all school's Senior High School coordinator in the Division of Iloilo. Attached in the google link is the approved permit to conduct the study and the letter containing of the researcher instruction on how the respondents going to accomplish the research instrument.

Upon retrieval of the accomplished questionnaires, the data were analyzed and interpreted using the thematic analysis.

Ethical Considerations

Before the administration of the research instrument, the researcher secured permission from Division Superintendent to conduct the study. The researcher considered ethical issues in the conduct of the study since professionals were used as respondents. Respondents were ensured of the confidentiality of the responses. This was explicitly written in the Letter to the Respondents. The researcher respected the rights, needs, values, and desires of the respondents. Moreover, the researcher was particularly cautious when asking questions that could elicit sensitive responses or questions about personal or sensitive problems. Furthermore, the researcher did not collect the names and e-mail addresses of the respondents. The data that were taken from them were kept private. The responses of the respondents were automatically deleted from the google drive and the hard copy of it were kept from the cabinet with lock; the only one with access to the documents is the researcher. In publishing the results of the study, the researcher would not include any information that would make it possible to identify them as a respondent. After the study is finished, all the documents with the data would be shredded to make sure that no data would leak and be used for deceitful purposes.

There was no conflict of interest that existed in this study since the researcher's decision to whom, how, when, why and where with regard to the conduct of this study are not influenced by personal interest. This is achieved because the researcher was not able to personally meet the respondents. The researcher instrument was administered through online platform and was facilitated by the

Division Senior High School Coordinator who acted as mediator. The researcher only gathered the data through the google drive after one week upon distribution thus, the conflict of interest was diminished.

The manuscript was subjected to a plagiarism check by Grammarly. The findings were carefully examined, assuring an objective interpretation of the data. Extensive effort was exerted to ensure honest discussion of methods, procedures, and reporting of data and results.

Results and Discussion

Results of the Qualitative Study

Level of Mathematics performance of the experimental and controlled group in the pretest and posttest

Table 1 revealed the level of Mathematics performance of the experimental and controlled group in the pretest and posttest exposed to video–recorded lessons and traditional method of teaching.

The level of Mathematics performance of the experimental group in the pretest and posttest were "Fairly Satisfactory" and "Satisfactory" with mean scores of (M = 7.03, SD = 1.129, M = 16.77, SD = 4.569) respectively.

Moreover, the level of Mathematics performance of the controlled group in the pretest and posttest were "Fairly Satisfactory" and "Satisfactory" with mean scores of (M = 7.00, SD = 1.390, and M = 13.27, SD = 3.258) respectively.

The pretest means scores of both groups show "Fairly Satisfactory" (M = 7.03, SD = 1.129 and M = 7.00, SD = 1.390).

Furthermore, in terms of posttest mean scores, subjects exposed to video–recorded lessons had higher mean scores (M = 16.77, SD = 4.569) than subjects exposed to traditional method of teaching (M = 13.27, SD = 3.258).

Table 1. *Level of Mathematics performance of the experimental and controlled group in the pretest and posttest*

Group	*n*	*SD*	*Mean*	*Description*
Experimental	30			
Pretest		1.129	7.03	Fairly Satisfactory
Posttest		4.569	16.77	Satisfactory
Control				
Pretest	30	1.390	7.00	Fairly Satisfactory
Posttest		3.258	13.27	Satisfactory

Difference in the Mathematics performance of learners in the pretest of the experimental and controlled group

Results of the t-test showed that there was no significant difference in the pretest mean scores of the experimental (M = 7.03, SD = 1.129) and control group (M =7.00, SD = 1.390); t(58) = .102, p = .919, at α=>0.05.

Table 2. *Difference in the Mathematics performance of learners in the pretest of the experimental and controlled group*

Group	*n*	*Mean*	*t-value*	*p-value*
Experimental	30	7.03		
Control	30	7.00	.102	.919

This shows that the pretest mean scores of the two groups are approximately equal. This result is proportionate with the implication that the subjects in this study were approximately similar. This could be ascertained that they have the same Mathematics performance in their pretest.

Moreover, in the study of Dopico, et.,al (2022) titled "Gender Similarities in the Mathematical Performance of Children," indicated the irrelevance or non – existence of gender differences in their mathematics performance.

Difference in the Mathematics performance of learners in the pretest and posttest of the experimental group

Results of the study showed that there was a significant difference in the Mathematics performance of learners in the pretest (M = 7.03, SD = 1.129) and posttest (M =16.77, SD = 4.569); of the experimental group exposed to video–recorded lessons; t(29) = -10.962, p = .000, at α=<0.05.

Table 3. *Difference in the Mathematics performance of learners in the pretest and posttest of the experimental group*

Experimental Group	*n*	*M*	*t-value*	*p-value*
Pretest	30	7.03	-10.962*	.000
Posttest		16.77		

**p<.001*

This further clarifies that learners' pretest and posttest scores differ in Mathematics performance.

In addition, it indicates that exposure to video–recorded lessons will enhance the Mathematics performance of learners. A study by Jeremias also supports this result, J et al. (2022). Findings revealed that video lessons were effective in all corners of the classroom, in which educators can use them to create time and space for active learning. Their study suggested that video lessons can be developed and utilized to improve the performance level of the students in Mathematics.

Difference in the Mathematics performance of learners in the pretest and posttest of the control group

Results of the study showed that there was a significant difference in the Mathematics performance of learners in the pretest (M = 7.00, SD = 1.390) and posttest (M = 13.27, SD = 3.258) of the controlled group exposed to the traditional method of teaching; t(29) = -10.500, p = .000, at α=<0.05.

Table 4. *Difference in the Mathematics performance of learners in the pretest and posttest of the controlled group*

Control Group	*n*	*Mean*	*t-value*	*p - value*
Pretest		7.00		
Posttest	30	13.27	-10.500*	.000

**p<.001*

This implies that after exposure to traditional method of teaching, learners' Mathematics performance in the pretest and posttest differ in their mean scores. This result was supported by the study of Ismail (2018). Findings revealed that using traditional methods increase success in the Mathematics performance of learners.

Furthermore, in the study of Cielo (2019), the traditional method of teaching is an old way of teaching where teachers are the leading players in the classroom while students are mere listeners. The teacher's method of teaching has a significant impact on the academic performance of the students. Many respondents responded that the students could understand their lesson by using the traditional method of teaching.

Difference in the Mathematics performance of learners in the posttest of the experimental and controlled group

Results of the study showed that there was a significant difference in the Mathematics performance of learners in the posttests of the experimental (M = 13.27, SD = 3.258) and controlled group (M = 13.27, SD = 3.258); t(58) = 3.416, p = .002, at α=<0.05. The mean score of the experimental group exposed to video–recorded lessons (M = 16.77) was higher than the mean score of the control group exposed to the traditional method of teaching (M = 13.27).

Table 5. *Difference in the Mathematics performance of learners in the posttest of the experimental and controlled group*

Group	*n*	*Mean*	*t-value*	*p-value*
Experimental	30	16.77		
Control	30	13.27	3.416*	.001

**p<.001*

This implies that video–recorded lesson is more effective and can significantly enhance the mathematics performance of learners compared to the traditional method of teaching.

According to (Edutopia, 2019), New teachers often struggle to find ways to amplify the curriculum. Video lessons can be a great help to assist students in gaining a deeper understanding of content. Students learn best by taking in information via multimedia modalities through reading, drawing, and viewing visual modalities.

In the study of Baer (2021), findings show that the posttest scores of experimental groups taught with video lessons are remarkably better than those taught the traditional approach.

Difference in the mean gain score of learners in the experimental and controlled group

Results of the study showed that there was a significant difference in the mean gain scores of Learners in the experimental (MG = 9.73, SD = 3.269) and controlled group (MG = 6.27, SD = 4.863); t(58) = 3.240, p = .002, at α=<0.05.

Table 6. *Difference in the mean gain score of learners of the experimental and controlled group*

Group	*n*	*Mean*	*t-value*	*p - value*
Experimental	30	9.73		
Control	30	6.27	3.240*	.002

**p<.001*

This implies that using video–recorded lessons is more effective in enhancing the mathematics performance of learners compared to traditional methods of teaching.

The quality of teaching and learning mathematics has been one of educators' significant challenges and concerns (Akdemir,2020). Considering that we are dealing with 21st-century learners, using video lessons is regarded as one of the most effective instructional tools to enhance the mathematics performance of learners compared (Islam, 2021).

Additionally, we are dealing with diverse learners, and it is a must to present them with various instructional methods to address their learning gaps in mathematics.

Furthermore, it suggests that teaching and learning will come up to greater heights of performance on the part of the students and contentment on the part of the teachers. A video lesson can be developed and utilized to improve the performance level of the students in mathematics.

Conclusions

Based on the study's findings, it can be concluded that utilizing video–recorded lessons in classroom instruction effectively enhances learners' mathematics performance.

The learners could learn better when technology is integrated into classroom instruction, such as video-recorded lessons. This phenomenon entails teachers keeping abreast with the changing scheme of classroom instruction, such as upgrading their teaching strategies.

Moreover, video-recorded lessons expose the learners to recorded videos about specific topics. They are allowed to manage their learning and difficulties in understanding mathematical concepts. Learners exposed to video–recorded lessons exhibit better mathematics performance.

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Affiliations and Corresponding Information

Lyneth D. Lamit
Efraim M. Santibańez National High School
Department of Education – Philippines

Mary June P. Panizales
San Enrique National Comprehensive High School
Department of Education – Philippines