CATCH-UP E-LEARNING: AN EXPERIMENTAL STUDY ON CONTEXTUALIZED VIDEO LESSONS IN GRADE 7 MATHEMATICS

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ABSTRACT

This determined the significance on the use of contextualized video lessons in augmenting the academic achievement of the Grade 7 students in Nabunturan National Comprehensive High School, Schools Division of Davao de Oro. Two general sections were utilized as control and experimental groups respectively. The study utilized quantitative research design specifically quasi-experimental. A researcher-made questionnaire in mathematics was utilized as research instrument. This was content-validated by a panel of experts and subjected to item analysis. Pretest was administered prior to the implementation of instruction. Interactive discussion was implemented in the control group while contextualized video lessons was utilized in the experimental group. After completing the lessons in the unit, posttest was administered. Results showed that both control and experimental groups showed improvement in their academic achievement from low in the pretest to moderate in their posttest. Further analysis showed that the control group's mean posttest score is significantly higher than their mean pretest score ($p<0.05$). Similarly, the mean posttest score of the experimental group was significantly higher than their mean pretest score ($p<0.05$). Finally, comparing the posttest scores of the groups showed that the mean posttest score of the experimental group is significantly higher than the mean posttest score of the control group ($p<0.05$). This concluded that the use of contextualized video lessons in the experimental group is more effective in improving the academic achievement of the students. The results suggest that teachers may take advantage on the use of contextualized video lessons to provide the learners with better learning experience.

Keyword : *Mathematics, catch-up e-learning, contextualized video lessons, interactive discussion, quasi-experimental, Department of Education, Davao de Oro, Philippines*

1. INTRODUCTION

1.1 The Problem and Its Background

The use of e-learning may provide significant impact in learning Mathematics. This approach encompasses a wide range of tools and methods including the use of contextualized video lessons. A number of strategic methods are being explored to aid in improving the academic achievement of the students in mathematics. A serious concern presented in the international assessment revealing that school children showed a decline in their achievement approximately losing 10 months of what they were supposed to learn in a school year [1]The use of contextualized video lesson may help the students achieve better understanding of complex concepts and improve their overall achievement [2]. Across the globe, cases on low academic achievement in mathematics have been shown in various

studies. Chand et al. [3] revealed in their findings the low performance of the students in Fiji; highlighting the need to use technology in teaching to improve the quality of instruction. Similarly, Mabena et al. [4] pointed out the underachievement of the students as a result of poor pedagogies utilized in the classrooms.

In the Philippines, learners struggle to reach the desired academic achievement as classes transitioned back to full in-person classes from blended learning modes. This observation was evident in the findings of Tagare Jr. [5] that students were demotivated to attend in-person classes, resulting to poor achievement. Additionally, learners were noted to be misbehaving, showing lack of interest, and may require retrofitting as the Department of Education (DepEd) implements the learning recovery plan in post-pandemic [5]. In Nabunturan National Comprehensive High School, Nabunturan, Davao de Oro, the achievement level of the Grade 7 students was 46.90% for SY 2022-2023. This level was based on the consolidated report of the school in the end of school year achievement report submitted to the District Office. This observation propelled the need to look for factors and possible intervention that can be utilized as a basis to improve the students' achievement in Mathematics.

As a teacher for seven years, the researcher became wary about the level of achievement of the learners for the past years. During the pandemic period, the researcher indulged in online teaching and used contextualized video lessons as a teaching strategy. The use of a teaching strategy may be necessary to facilitate the improvement of the students' achievement. Mathematics subject is perceived to be a difficult subject and quite not an easy area to learn. Hence, it was hoped that the use of contextualized video lessons or catch-up e-learning strategy as a supplemental intervention can improve the achievement of the students.

1.2 Review of Related Literature

E-learning is an educational method that use the Internet to give instruction, allowing for learning to take place inside and outside of a typical classroom environment. The main rationale for this technique stems from its capacity to offer pupils greater opportunities to obtain education in comparison to conventional teaching approaches. This level of accessibility enables students to initiate their studies from nearly any location and at any given moment. Online learning entails the exchange of information between students and professors via digital platforms. Students can access teaching via online platforms, even in the absence of physical proximity to their lecturers [6] form of distance education is electronic learning, which relies on information and communication technologies. Electronic learning utilizes auditory, visual, and computer-based components to facilitate the learning process. Educational messages are conveyed to the student through many mediums such as text, audio, visuals, and graphics using educational programs [7]. Electronic learning can be classified into two primary forms based on synchronicity: synchronous and asynchronous. Synchronous e-learning requires all participants to be present in the virtual class at the same time. Asynchronous e-learning involves the delivery of educational content from a web-based server to the learner's computer. According to Fallon and Brown [8]. this allows learners to access their courses at any time. Electronic learning encompasses multiple components and factors, such as objectives, digital content, instructional activities, educational materials and resources, learning management systems, teacher or instructor attributes, and electronic learner attributes [9]. Thus, examining the attributes and traits of each of these factors can enhance and enhance the quality of virtual curriculum.

Contextualized Video Lessons. Mathematics teachers face significant challenges in bridging the learning gap and ensuring that pupils acquire the necessary mathematical abilities to sustain their learning. Teachers now have a broader array of resources available to assist students in understanding mathematical concepts. A combination of traditional and modern teaching methods can effectively cater learners with different abilities, particularly considering the difficulty of the subject [10]. Therefore, the researcher posits that the integration of authentic and well-structured learning films is the most appropriate technique for enhancing the instructional experience for Mathematics teachers and learners. This category encompasses content, lectures, brief knowledge snippets, tutorials, and similar materials [11]. Students are exhibiting a growing inclination to proactively engage in their education by fostering an individualized learning atmosphere both within and beyond the confines of the classroom [12]. Learners have the potential to enhance their learning outcomes through the utilization of cell phone movies, which serve as effective tools for instructing pupils in the acquisition of essential skills. Furthermore, it is possible that this could lead to a significantly heightened level of desire for learning, improved confidence in the acquisition of a skill, and overall satisfaction with the course [13]. According to Sagge and Segura [14], the utilization of video in educational settings has been found to be a successful method for actively involving students and facilitating their comprehension. Further, the findings assert that incorporating video into the classroom would facilitate teachers in

effectively communicating essential concepts to students and enhance their engagement in the learning process. Videos can facilitate learning and growth through various means, such as acquiring new skills, altering existing viewpoints, stimulating cognitive processes, and storing previously acquired knowledge [15]. Moreover, Malaluan and Andrade [16] conducted a study on the implementation of contextualized, question-embedded, video-based teaching materials with tenth-grade students. Their findings demonstrated that these techniques markedly enhanced students' attention and critical thinking abilities, implying that including questions into video sessions can render Mathematics more engaging and intellectually stimulating.

Interactive Discussion. Interactive talks between teachers and students have gained popularity in educational environments because of their ability to improve student engagement and learning results. These debates need active engagement from both educators and learners, promoting a collaborative educational atmosphere [17]. Interactive talks can markedly elevate student motivation. When students perceive their contributions as valued and recognize their important role in the learning process, their intrinsic motivation to learn escalates [18]. This is further supported by Freeman et al. [19] by stressing that the transition to student-centered learning underscores the significance of interactive dialogues. In this strategy, the educator serves as a facilitator, directing students as they investigate issues and develop their own comprehension. Establishing a robust relationship between educators and students is essential for effective interactive discussions. Students are more inclined to participate actively and engage with the curriculum when they feel comfortable and supported [20]. However, the size of a class can affect the efficacy of interactive conversations. Reduced class numbers facilitate enhanced customized interactions and superior administration of group activities, resulting in higher student results [21].

Academic Achievement. Academic achievement is impacted by a variety of elements including socio-economic conditions, parental engagement, student drive, effective teaching methods, and cognitive-emotional aspects. Gaining insight into these factors can assist educators, policymakers, and parents in establishing conducive settings that foster student achievement and improve educational results. According to Hanushek and Woessmann [22] Germany had a decline in Mathematics achievement over the preceding academic year due to the closure of schools, in comparison to previous years. As Engzell, et al. [23] observed there is a comparable results among pupils in the Netherlands, wherein their performance in Mathematics that exhibited a fall of three percentile points. This was further exacerbated by the substantial learning gap observed during the present health disaster [24].

The level of student motivation is strongly correlated with their academic performance. Theories on motivation, such as Deci and Ryan's Self-Determination Theory, propose that intrinsic motivation has a substantial influence on academic success. It was pointed out by Jeynes [25] that students who possess intrinsic motivation are more inclined to actively and profoundly interact with the subject matter, resulting in improved academic achievements.

Contrary to the belief of some academics, who argue that the ability to acquire and create new information is more important than specialized knowledge and thinking abilities for professionals and future citizens. One of the most crucial cognitive abilities is the aptitude for higher-order reasoning. Some researchers have acknowledged that the growth and development of these advanced cognitive abilities are a significant factor in facilitating students' transformation, acquisition of new knowledge and skills, and progression towards taking responsible action [26]. Thinking skills refer to cognitive abilities that are employed to investigate the surrounding environment, resolve issues, and form assessments. Thinking skills can be categorized into two distinct groups: Lower Order Thinking Skills (LOTS) and Higher Order Thinking Skills (HOTS). Higher Order Thinking Skills (HOTS) build upon lower Order Thinking Skills (LOTS) such as distinguishing, analyzing, and applying simple use and content-related strategies [27].

Correlation Between Measures. The study of Malaluan and Andrade [28] showed how contextualized video lessons impact the students academic achievement in mathematics. According to the results, students' interest and critical thinking abilities can be raised by utilizing a contextualized video-based teaching and learning tool. Additionally, students' attitudes, actions, mathematical experiences, and use of contextualized question-embedded video-based teaching and learning tools varied significantly depending on their level of mathematical curiosity. Significant disparities in critical thinking abilities were also evident. On the same stance, Insorio and Macandog [29] revealed in their findings that the use video playlist from YouTube aided the students in comprehending and improving their mathematical skills. Students' confidence in completing assignments and responding to learning activities increased after watching the aforementioned intervention. Further, Sagge Jr and Segura Jr [14] emphasized in their findings that videos offer more powerful visual signals. They are designed to aid students in understanding the events,

especially in cases where language interpretation is required. The authors underscored that learners were drawn to this method of instruction because it helped them develop the knowledge and critical thinking skills that are the objectives of the high school mathematics curriculum.

1.3 Theoretical Framework

The study was anchored to the cognitive theory of multimedia learning, as proposed by Mayer [30] and further developed by Clark and Mayer [31], which served as fundamental framework for understanding the mechanisms that influenced the effectiveness of video-based learning. Learning videos are widely regarded as essential educational resources that teachers in the present era can effectively utilize. This instructional intervention has the potential to be bolstered by educational theories, including the Cognitive Theory of multimedia learning. The cognitive system of the human body possessed two distinct channels for the processing of visual and graphical information, as well as auditory and spoken information [31]. The effectiveness of multimedia educational messages is in their ability to facilitate appropriate cognitive processing for learners, while avoiding excessive strain on their mental resources. When creating instructional videos, it is highly recommended to divide them into easily comprehensible segments. According to the Multimedia Learning Theory, video courses that are well-organized can facilitate students' reflection on their thinking processes and enable them to comprehend the teachings presented in the videos during the learning process. Educators play a crucial role in providing instructional support by adhering to the principles and methodologies outlined in the design and creation of films, as well as in the selection of activities and educational content. With this, the study endeavored to test the effectiveness of a teaching strategy as catch up e-learning for the students. The independent variables in the study were the teaching strategies adopted. The students of the control group were exposed to the traditional direct-interactive method while the students of the experimental group were exposed to the contextualized video lessons as supplementary material for the students' learning. The dependent variables of the study were the academic achievements of the students as measured by a researcher-made instrument duly validated prior to administration. As shown in figure 1, it was hypothesized that the teaching strategy directly affected to the academic achievements of the learners as measured in their pretest and posttest scores both in the control and experimental groups. Hypothetically, the use of contextualized video lesson could directly impact the students' academic achievements in Mathematics.

Figure 1 presents the conceptual framework of the study.

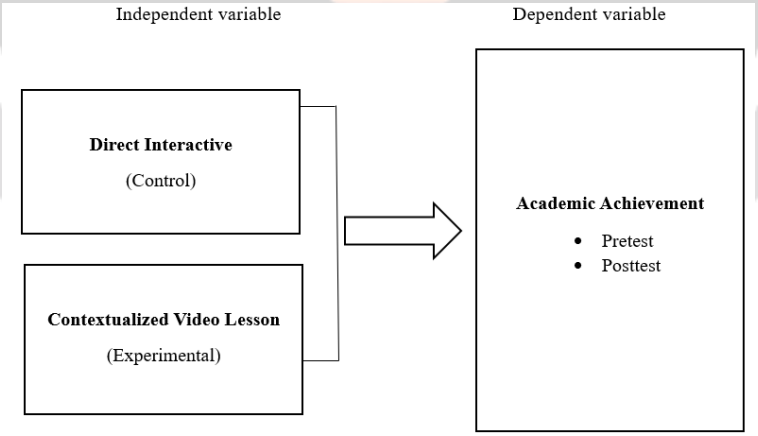

Fig -1: Conceptual Framework

1.4 Statement of the Problem

The main purpose of the study was to determine the effect of teacher-made contextualized video lessons in the students' academic achievement in Mathematics. The findings of the study hoped to answer the following questions.

1. What are the pretest mean scores in Mathematics of the students in the control and experimental groups?
2. What are the posttest mean scores in Mathematics of the students in the control and experimental groups?

3. Is there a significant difference in the pretest and posttest mean scores in Mathematics of the students in the control group?
4. Is there a significant difference in the pretest and posttest mean scores in Mathematics of the students in the experimental group?
5. Is there a significant difference in the posttest mean scores in Mathematics of the students between the control and experimental groups?

1.5 Null Hypothesis

To treat the problems accurately the hypotheses below were formulated and were tested at 5% level of significance:

Ho1: There is no significant difference in the pretest and posttest mean scores of the students in Mathematics in the control group.

Ho2: There is no significant difference in the pretest and posttest mean scores of the students in Mathematics in the experimental group.

Ho3: There is no significant difference in the posttest mean scores of the students in Mathematics between the control and experimental group.

1.6 Scope and Delimitation of the Study

The focus of the study was confined to the Grade 7 students of Nabunturan National High Comprehensive High School, Nabunturan, Davao de Oro, enrolled during the school year 2024-2025. The control and experimental groups were from the same grade level. The study was delimited to the scores of the students garnered in their pretest and posttest administered before and after the study periods, respectively. Further, the topics were delimited to the students' achievement scores in Mathematics on selected competencies of the first quarter covered for the duration of the study. Specifically, the following competencies for quarter 1 include the following: describe given rational numbers as fractions, decimals, or percentages; order rational numbers on a number line and perform operations on rational numbers. These three competencies served as essential building blocks in solving mathematical problems and more topics in Algebra. The experiment duration covered three weeks at one competency per week.

1.7 Significance of the Study

The findings of the study could provide new insights into the factors that significantly influenced the academic achievements towards learning Mathematics of the students in public secondary schools.
In particular, the study hoped to benefit the following:

The utilization of contextualized video lessons could help the *learners* improve their academic achievement. The concept that visual representations, simulations, and demonstrations could facilitate the process of conceptual visualization, thus, enhancing students' comprehension and rendering them more concrete. Subsequently, the findings of the study could facilitate the *teachers'* provision of effective instruction. The findings could encourage the teachers to create multiple versions of video lessons tailored to different learning levels or individual student needs. This would allow for more personalized learning experiences, ensuring that each student can grasp the material at their own level. Also, the results may be valuable to the *school administrators* because of its potential for integration into data analytics systems which enable the tracking of staff engagement and the evaluation of training efforts' performance. This data could be utilized by administrators to formulate well-informed decisions on future training priorities and the allocation of resources. The findings would serve as basis for D*epEd officials* to effectively guarantee that the teachers adhere to authorized curriculum rules and teaching methodologies, thus upholding educational standards and quality universally to promote achievement and positive attitude towards learning. Finally, the future researchers who want to confirm the conclusions of this study may find this study useful. Furthermore, the findings might be used as a framework for individuals who want to do similar research.

2. METHODS

2.1 Research Design

The researcher employed a quasi-experimental research design given that the sample under investigation consisting of two groups: Control and Experimental. Quasi-experimental research designs employed nonexperimental variation in the primary independent variable of interest, resembling experimental conditions where certain subjects were exposed to treatment while others were not (Jelena & Jelena, 2022). Further, a non-equivalent quasi-experimental design is a research methodology employed to investigate the impact of an intervention of participants without employing random assignment to experimental and control groups. In this study, the experimental group was provided with pre-recorded, teacher-made learning videos to supplement the lessons, whereas the control group was taught using direct-interactive mode of teaching as conventional method.

2.2 Research Locale

The research study was conducted in Nabunturan National Comprehensive High School, Nabunturan West District, Division of Davao de Oro. The locale was chosen since this is one of the schools with a big population, and diverse groups. Besides, the school is tagged as the home of the achievers with a number of accomplishments in the field of sports and other academic-related. Geographically, the region currently referred to as Davao de Oro was previously recognized as Compostela Valley Province and was separated from the province of Davao del Norte with the enactment of Republic Act 8470 on 8 March 1998. It commemorates its establishment anniversary annually on the 8th of March. Republic Act 11297, adopted on 17 April 2019 and affirmed in a plebiscite held on 7 December 2019, legally changed the name of the province from Compostela Valley to Davao de Oro.

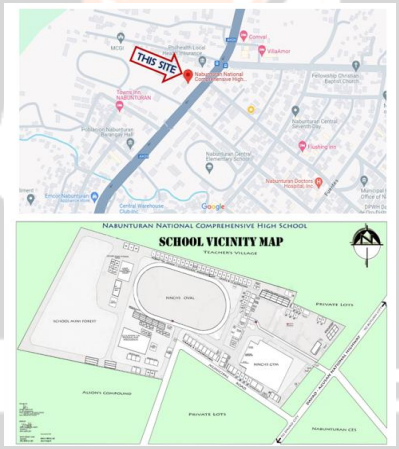

Fig -2: Map of the Research Locale

2.3 Subjects of the Study

The research study utilized two sections of Grade 7 namely sections Talisay and Dao as control and experimental group, respectively. The students belonging to these sections were not randomly selected from all Grade 7 level since there were already pre-existing sectioning of classes at the start of the school year. To address reliability and validity issues, the two groups were drawn from the general sections and were given pretest to establish that they were at par with each other before the introduction of the intervention. There were 40 students in the control and experimental group, respectively. Table 1 shows the distribution of the subjects of the study.

Table -1 Subjects of the Study

Groups	Number of Students
Control (Grade 7 Talisay)	40
Experimental (Grade 7 Dao)	40

Source: NNCHS Registrar's Office

2.4 Research Instrument

Test Questionnaire in Mathematics. The researcher created a 40-item multiple-choice test questionnaire in Mathematics to measure the academic achievement of the students in this subject. These items were made based from the DepEd's MATATAG Curriculum for Grade 7 Mathematics in Quarter 1. The assessment material was composed of eight items focused on describing given rational numbers as fractions, decimals, or percentages; eight items on ordering rational numbers on a number line; and, 24 items on performing operations on rational numbers. Each item adopted a multiple-choice items, ranging from A to D, and were framed to measure the competencies being tested. In addition, a table of specification (TOS) were made to specify the competencies of each item of the test. The percentage scores of the respondents were determined to measure the academic achievement garnered. The percentage scores were derived by dividing the raw scores by the highest possible score multiplied by 100.

To determine the level of students' academic achievement or their level of competency, the following parameters, descriptive equivalents, and interpretations presented below were used as adapted from the work of Smith and Brown (2024).

Parameter Limits	Descriptive Equivalent	Interpretation
80.01 - 100.00	Very High	This means that the academic achievement of the students is outstanding.
60.01 - 80.00	High	This means that the academic achievement of the students is very satisfactory
40.01 - 60.00	Moderate	This means that the academic achievement of the students is satisfactory
20.01 – 40.00	Low	This means that the academic achievement of the students is unsatisfactory.
0.00 - 20.00	Very Low	This means that the academic achievement of the students is very unsatisfactory.

2.5 Validity and Reliability of the Research Instruments

The questionnaire was subjected to content validation and item analysis to ensure that it exactly measured the objectives set forth in the study. A panel of experts were requested to validate the contents of the test to ensure that the questionnaire was within the scope intended for this study. Similarly, the contents of the questionnaire were also evaluated for ethical consideration. The questionnaire was then pilot-tested for refinement and improvement. The pilot test was administered to 30 students who were not part of the research experimental subjects. Item analysis was then performed of the pilot-test results to determine which of the items should be retained and be improved in the instrument. Table 2 shows the results of the item analysis of the researcher-made instrument.

Table -1 Item Analysis of the Researcher-Made Questionnaire

Descriptive Rating	Discrimination (%)	Difficulty (%)	Overall(%)	Remarks
Very Good	22.5	77.5	20.0	Retained
Good	57.5	22.5	80.0	Retained
Fair	20.0	-	-	Retained

The results of the item analysis of the researcher-made questionnaire for Mathematics, showed that all the items were retained as supported in the discrimination and difficulty indices. The descriptive rating very good and good indicate the overall quality of the test items. The items described as very good had a discrimination index of 22.5% indicates low discrimination value, while the difficulty index was 77.5% indicating that the items were relatively easy. Twenty percent (20%) of the items had a discriminatory index of fair. On the other hand, the items described as good showed a discrimination index of 57.5% indicating that the items had higher discrimination value compared to the "very good" category. These items were better at differentiating between high and low performers. Further, these items had a difficulty percentage of 22.5% indicating that the items in this category were relatively difficult, with only 22.5% of test-takers answering them correctly.

2.6 Research Procedure

Seeking permission to conduct the study. Permission to perform the study was sought by the researcher. After all protocols have been reviewed and observed, the researcher obtained an endorsement letter from the Dean of Graduate School of the Assumption College of Nabunturan. After that, the researcher sent a letter of approval to conduct the study to the Office of the Schools Division Superintendent of Davao de Oro, along with the endorsement letter as an attachment. Upon approval, a copy on the permit to conduct the study was furnished to the School Principal of Nabunturan National Comprehensive High School which served as the research locale to gain access to the respondents.

General orientation and seeking of consent from research respondents. The respondents and their parents were given a general orientation into which the researcher discussed the purpose of the research, the extent of the respondents' participation, mode of data collection, type of data that will be gathered, and the mode of data processing and presentation. The ethical considerations were discussed as well. Further, confidentiality of gathered information were also assured. Subsequently, the subjects were requested to voluntarily sign forms; parental consent for the parents and assent form for the respondents. Pre-tests were personally administered by the researcher to both control and experimental groups.

Implementation of Catch-up e-learning. The researcher utilized the contextualized video lessons developed by the researcher. A week-long video lessons were provided to the learners. These videos were to be viewed by the learners at home as supplementary materials. After each regular class schedule, the students in the experimental group were given a set of math exercises and guide questions. These exercises served as was their guide in watching the contextualized teacher-made video lessons which in a 3 to 4 minutes duration. Their outputs would be submitted the following day.

Implementation of Interactive Discussion for the control group. The students in the control group regularly adopted to the conventional teaching Mathematics of interactive discussion similar to the experimental except for the supplementary materials.

Administration and Retrieval of the Questionnaire. The researcher personally administered the research instrument in the post-test for both the control and experimental groups. The administration of the test was in face-to-face modality. Since there were 40 items, a maximum of 60 minutes was allotted for the students to complete the test.

Checking, Collating and Processing of Data. Exam papers were personally checked by the researcher. Scores were collated in Microsoft Excel and was sent to the assigned statistician of Assumption College of Nabunturan for processing. The respondents were assigned with numbers or codes instead of their real names. Meanwhile, the interpretation of the data was made by the researcher.

2.7 Statistical Treatment of Data

For comprehensive interpretation and analysis of data, the following statistical tools in Statistical Package for the Social Sciences (SPSS) were used. Specifically, *mean* was used to determine the level of the students' achievements in the pretests and posttests, both in the experimental and control groups. This was followed by the *independent t-test* which was used to determine the significance of the differences of the scores comparatively in the experimental and control groups. Finally, the *paired t-test* was used to determine the significance of the differences of the scores in the pretest and posttest of the respondents within a group.

3 RESULTS

3.1 Mean Pretest Score of the Control and Experimental Group

Table - 3 Mean Pretest Score of the Control and Experimental Group

Group	Number of Students	Mean	Percentage Score	Descriptive Equivalent
Control (Talisay)	40	10.80	27.00%	Low
Experimental (Dao)	40	10.63	26.58%	Low

It can be gleaned from the table that the control group had a mean pretest score of 10.80 while the experimental group had a mean pretest score of 10.63 with a percentage score equivalent of 27.00% and 26.58%, respectively. Both the control group and experimental group's mean pretest scores were described as low. The mean pretest scores were interpreted as unsatisfactory for both groups.

3.2 Mean Posttest Scores of the Control and Experimental Group

Table – 4 Mean Posttest Scores of the Control and Experimental Groups

Group	**Number of Students**	**Mean**	**Percentage Score**	**Descriptive Equivalent**
Control	40	16.68	41.70%	Moderate
Experimental	40	19.80	49.50%	Moderate

It can be seen from the table that the mean posttest score of the control group was 16.68 equivalent to 41.70%, described as moderate. The mean posttest score of the experimental group was 19.80 or 49.50%, described as moderate.

3.3 Analysis of the Mean Pretest and Posttest Scores of the Control Group

Table – 5 Analysis of the Mean Pretest and Posttest Scores of the Control Group

Control Group	N	Mean	P-value	Interpretation
Pretest	40	10.80	0.000	Significant
Posttest	40	16.68		

The table indicates that increase in the posttest score of the control group after the intervention; from 10.80 in the pretest to 16.68 in the posttest. Analysis of the data revealed that the difference is significant, with a computed t-value of 0.000; less than the set alpha value of 0.05.

3.4 Analysis of the Mean Pretest and Posttest Score of the Experimental Group

Table – 6 Analysis of the Mean Pretest and Posttest Scores of the Experimental Group

Experimental Group	N	Mean	P-value	Interpretation
Pretest	40	10.63	0.000	Significant
Posttest	40	19.80	α = 5%	

The data in the table showed an increment in the mean scores of the students in the experimental group from 10.63 in the pretest to 19.80 in the posttest. Further analysis revealed that the difference in the mean pretest and posttest score was significant.

3.5 Analysis of the Mean Posttest Score of the Control and Experimental Group

Table - 7 Analysis of the Mean Posttest Scores of the Control and Experimental Groups

Group	N	Mean	P-value	Interpretation
Control (Dao)	40	16.68	0.002	Significant
Experimental (Talisay)	40	19.80		

Table 7 shows that the mean posttest score of the control group is 16.68 while the experimental group was 19.80. Results of the analysis revealed that the experimental group scored significantly higher as compared to the control group. This is evident in the computed p-value of 0.002 which is lower than the set alpha value of 0.05.

4 DISCUSSIONS AND CONCLUSION

4.1 Discussions

The pretest scores of the control and experimental groups were both described as low. The findings showed that before the start of the study period, both classes showed unsatisfactory in their scores in Mathematics, which entails that both classes showed limited knowledge of the topics to be covered in the unit. The findings of the study were consistent of the claim of Azevedo et al. [1] claimed about the decline on the achievement of the learners. Despite of the fact that formal classes were not held yet on the topics for the unit, however, with the spiral progression in the K-12 program, students were expected to have at least a prior knowledge of the concepts. In support, Tagare Jr [5] underscored that the students performed poorly in mathematics for the past three years which was one of the notable impacts of the pandemic. In addition, he pointed out that the learning recovery plan of the Department of Education require the teachers to make the students more engaged in the lessons. Notably, both groups were at par in terms of their knowledge about the topics prior to the start of the intervention. This conforms with the idea of Dimitrov and Rumrill [33] posited that both control and experimental groups had to be at par with each other before the start of the intervention. The condition guaranteed that both groups were to commence from an equivalent baseline, facilitating an equitable comparison of the experimental treatment's effects. Moreover, the authors emphasized that this mechanism accounts for any pre-existing discrepancies between the groups that may influence the outcome, guaranteeing that any detected variations in posttest scores are attributable to the treatment rather than prior inequalities.

The descriptive presentation of the mean posttest scores of the control and experimental group revealed that both groups had shown improvement in their scores after the research period. In fact, both groups obtained a descriptive equivalent of moderate, which means that the academic achievements of the students in Mathematics were satisfactory. The improvement in the increment scores were notable with low in the pretest scores and moderate in the posttest scores. The increment in the scores indicate that both methods aided in the improvement of the academic achievement of the students in Mathematics. As argued in the work of Hofkens et al. [17], interaction between the teacher and the students during classes improved the learning outcomes. In support, Ryan and Deci [18] revealed in their findings that the use of interactive discussion as used in the control group improved the academic achievement of the students since this allowed immediate feedbacking and outright recognition of the students' success. On the other hand, Sagge and Segura [14] pointed out that the use of contextualized video lessons facilitated comprehension of complex problems in mathematics. Incorporating video lessons in classes facilitate effective instruction and engagement for learning.

The comparison of the pretest-posttest scores in mathematics of the students in the control group revealed that the mean posttest score of the students was significantly higher than the mean pretest score; $p < 0.05$. Hence, this finding is sufficient to reject the null hypothesis that there is no significant difference in the pretest-posttest scores in Mathematics of the students in the control group. This further implies that the effectiveness of the interactive discussion or the conventional teaching methods in raising the academic achievement of the students in mathematics cannot be undermined. The results of the study were parallel to the findings of Arthur et al. [34] that the use of interactive discussion in mathematics classes ensures that students are able to grasp

the contents of the lesson. In support, Kihwele and Mkomwa [35] posited that facilitating classes using interactive discussion allowed the teachers to concretely explain the difficult concepts in mathematics to the students in a straightforward manner. The findings were also parallels with that of Wubbels et al. [20] emphasizing that interactive discussion effectively engage the learners; making them comfortable in learning mathematics. Although class size is a limitation of interactive discussion, however, with the right pacing, Blatchford et al.[21] posited that higher results in mathematics tests could be expected with the enhanced interactions between the teacher and the students.

Results of the mean posttest scores of the students in the experimental group showed that it is significantly higher than the mean pretest scores. The increment in the score evidently showed improvement from unsatisfactory to satisfactory achievement in Mathematics. This is substantial evidence that the use of contextualized video lessons significantly improved the students' achievement in Mathematics. Thus, the null hypothesis that there is no significant difference in the pretest-posttest scores in Mathematics of the students in the experimental group was rejected. The use of contextualized video lesson in the experimental group provides venue for having lectures in a creative way [11]. In addition, Beltran [13] revealed in his findings that the use of multimedia like the video lessons improved the performance of the learners. In support, Malaluan and Andrade [16] showed that contextualized video lessons positively improved the academic achievement of the students in mathematics. Similarly, Insorio and Macandog [29] argued that video lessons successfully improved the cognitive ability of the students in mathematics.

Testing the significance of the score difference in the posttest for the control and experimental groups revealed that the experimental group scored significantly higher than the control group. This means that the use of contextualized video lessons significantly improves the academic achievement of the learners as compared to those who were exposed to the conventional interactive discussion. The data is sufficient to reject the null hypothesis that there is no significant difference in the mean posttest scores of the control and experimental groups after the intervention. The finding is aligned with the cognitive theory of multimedia. According to Clark and Mayer [31], video-based lessons stimulate the cognitive understanding of the students in their lessons. In support, Pahayahay and Khalili-Mahani [32] showed that when video lessons were properly organized and implemented, the academic achievements of the students would significantly improve.

Further, Sagge and Segura [30] showed that video lessons being utilized in the classrooms facilitated the students' comprehension in mathematics. This observation was also supported in the findings of Chen and Chan [15] that multimedia like video lessons used in mathematics classes influence the acquisition of knowledge; thereby improving the students' academic achievement.

4.2 Conclusion

On the basis of the results and discussions, the following conclusions were drawn:

The mean pretest score in Mathematics of the control group was 10.80 while that the experimental group was 10.63. These results showed that the control and experimental groups were equivalent in competency level prior to the intervention's commencement. In view of the posttest scores in in Mathematics of the students in the control and experimental groups, the finding were decisive to establish that both groups improved in their academic achievement from low to moderate. This is conclusive that the use of interactive discussion in the control group and the exposure to contextualized video lessons in the experimental both facilitated the improvement on the academic achievement of the students. With regards to the first null hypothesis, the data revealed that that the mean posttest score of the students in the control group was significantly higher than the mean pretest score, $p < 0.05$. Hence, the first null hypothesis was rejected. Subsequently, for the second null hypothesis, the result shows that the posttest scores of the students in the experimental group was significantly higher than their pretest; $p<0.05$. Hence, it is resolved that the null hypothesis that there is no significant difference in the pretest-posttest scores in Mathematics of the students in the experimental group was rejected. Finally, the test for the third null hypothesis revealed that the experimental group scored significantly higher in the posttest as compared to the control group; $p<0.05$. Thus, this means that the use of contextualized video lessons had caused a significance. The findings were sufficient to conclude that the use of contextualized video lessons was more effective compared to the use interactive discussion in improving the academic achievement of the students in Mathematics. Therefore, the null hypothesis that there is no significant

difference in the posttest scores in Mathematics of the students in the control and experimental groups was rejected.

4.3 Recommendations

On the ground of the results, discussions and conclusions of this study, the following recommendations were made:

The academic achievement of the students is satisfactory which is indicative on the need to raise it considering the global decline of academic achievement in mathematics. The teachers may adopt strategies that will further enhance the understanding of the students such as making the video lessons more interactive. In addition, supplemental worksheets may be crafted to be used as independent practice exercises after learning from the video lessons.

Teachers are encouraged to combine contextualized video lessons with conventional teaching methods to create a blended learning environment. This approach ensures that students benefit from both visual and interactive learning experiences. Consequently, instructional leaders are encouraged to regularly assess and evaluate the impact of contextualized video lessons on students' academic achievement in mathematics. The use of data-driven insights to continuously improve the quality and effectiveness of the videos may be beneficial.

Moreover, the school administrators may implement upgrading of the school facilities to support the needs of the teachers to utilize video lessons in classes. Teachers may also be provided with upgrading on the creation of contextual multimedia materials to be used in their classes. Finally, future researchers may utilize the data as basis for developing other strategies that may improve the academic achievement of the learners.

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