

**The effectiveness of teacher-made short-form videos
on student academic performance in Mathematics**

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ABSTRACT

This study investigates the effectiveness of teacher-made short-form videos in improving the academic performance of Grade 7 to Grade 10 students in Mathematics at Lakes City Christian School, San Pablo City, Laguna. With the integration of digital tools into education encouraged by national policies such as Republic Act No. 11899 and DepEd Order No. 21, s. 2019, the study explores how short-form videos—specifically those created by teachers—can serve as innovative and engaging instructional materials. Utilizing a quasi-experimental design, the research involved 237 students who underwent pre-test and post-test assessments to evaluate learning gains after the video-based intervention. Grounded in Cognitive Load Theory and the ADDIE instructional model, teacher-made videos were designed to boost comprehension and retention. Results showed statistically significant gains in student scores across all grade levels, suggesting that short-form videos effectively improved understanding and engagement in Mathematics. The study was limited to private high school students with digital access and did not examine other subjects or long-term retention. Still, it offers strong evidence for using teacher-made short-form videos as a supplementary classroom tool. The findings hold valuable implications for educators, institutions, and researchers aiming to enhance learning outcomes through educational technology.

Keywords: short-form videos, Mathematics education, academic performance, Cognitive Load Theory, multimedia learning, ADDIE model

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INTRODUCTION

The integration of digital technology in education has been strongly reinforced by national policies and regulations that encourage its use for instructional purposes. Republic Act No. 11899, otherwise known as the “Second Congressional Commission on Education (EdCom II) Act,” underscores the significance of 21st-century skills, with digital literacy at the core of defining a competent learner. The law acknowledges that conventional teaching methods are insufficient to fully engage learners in the age of media and technology. It emphasizes not only the need for learners to cultivate digital judgment and critical thinking but also for teachers to be equipped with the skills to incorporate digital tools effectively into pedagogy. This shift signals the transformation toward a digitally enabled learning environment designed to foster critical thinkers and responsible digital citizens. Complementing this mandate, the Department of Education’s (DepEd) Order No. 21, s. 2019 highlights the importance of embedding technology into the K–12 curriculum to enrich student learning experiences. It advocates for the adoption of web-based resources, digital tools, and innovative pedagogical strategies to support diverse learning styles and to prepare learners for active participation in a digital society. Together, these legislative frameworks establish a foundation for exploring the instructional potential of emerging digital mediums in contemporary classrooms.

Despite these policy directions, challenges persist in fully maximizing digital resources within teaching practices. The increasing popularity of social media, particularly platforms centered on short-form video content, reflects evolving student consumption habits. Yet, their potential as tools for learning—especially in Mathematics education—remains underutilized (Ebere & Abaver, 2024). While traditional pedagogical approaches continue to play an important role, they often struggle to sustain students’ attention amid an environment saturated with rapidly consumed digital media. This gap necessitates pedagogical innovations that bridge the divide between conventional teaching practices and the digital tendencies of modern learners. In this context, the present study seeks to examine the effectiveness of teacher-produced short-form videos as tools for enhancing Mathematics learning. Specifically, it investigates their impact on comprehension, retention, and engagement, thereby aligning traditional methodologies with the possibilities afforded by digital technology.

The increasing penetration of digital technology in the Philippines further strengthens the relevance of this research. As of January 2024, the country recorded 86.75 million social media users, equivalent to 73.4% of its total population. This widespread digital engagement provides educators with unique opportunities to integrate technology into pedagogical practices aimed at improving student outcomes. Previous studies affirm the instructional value of teacher-created video content in Mathematics. Nabayra (2022), for instance, revealed that freshman university students found teacher-produced videos to be complete, adaptable, and effective in facilitating Mathematics learning under the “new normal” conditions. Likewise, Dejecacion (2022) demonstrated that teacher-created video lessons significantly enhanced the Mathematics performance of ninth-grade students in a public technical-vocational high school. These findings suggest that teacher-generated short-form videos can align instructional delivery with students’ online learning preferences, thereby addressing persistent challenges in Mathematics education.

Nevertheless, the integration of digital video resources in instruction is not without challenges. Issues such as ensuring content validity, stimulating student interest, and minimizing distractions must be carefully considered to maximize their pedagogical effectiveness. This study, therefore, seeks to contribute to the discourse by exploring the role of teacher-produced short-form videos in improving student learning performance in Mathematics. By focusing on dimensions such as interest, comprehension, and achievement, the research aims to provide empirical evidence and practical insights that will benefit teachers, policymakers, and learners alike. In doing so, it addresses the ongoing need to harmonize digital innovation with pedagogical rigor to enhance Mathematics education in the 21st-century classroom.

Statement of the problem

This study aims to determine the effectiveness of teacher-made short-form videos on student academic performance in mathematics of Grade 7 to Grade 10 students at Lakes City Christian School. Specifically, it sought answers to the following questions

1. What is the academic performance of the students in mathematics before the teacher-made short-form videos?
2. Based on the result, what enhancement to teacher-made short-form videos may be proposed?
3. What is the academic performance of the students in mathematics after the teacher-made short-form videos?
4. Is there a significant difference in the academic performance of the students in mathematics before and after the teacher-made short-form videos?

METHODOLOGY

This study utilized a quasi-experimental design to determine the effectiveness of teacher-made short-form videos as an instructional intervention support for math learning. The overall aim of this study is to critically assess and establish the effectiveness of utilizing teacher-made short-form videos as an instructional support for enhancing mathematical learning outcomes. Quasi-experimental design, as defined by Campbell and Stanley (1963), refers to a research method in which an independent variable is manipulated. This type of design is suitable on the grounds that it offers a practical way of implementing the intervention under natural conditions in an educational setting. By taking measurements of pre-test and post-test scores of the same learners after the intervention, the researcher can directly compare the effect of the teacher-made short-form videos on the learning performance of students in the mathematics lesson. This method helps decide if improved academic performance is as a result of the teacher-made short-form videos. The quasi-experimental design is helpful in responding to these research questions since it enables the researcher to carry out the study in real classroom settings without disrupting current classroom constructions. The design will render the findings statistically significant, as well as relevant and useful in real classroom settings.

The respondents of the study consisted of 237 students from Grade 7 to Grade 10 at Lakes City Christian School, San Pablo City, Laguna, and were determined using purposive

sampling. The study is conducted at Lakes City Christian School, which is located at San Francisco San Pablo City, Laguna. The school offers elementary, high school, and senior high school education.

The respondents were chosen based on the following selection criteria: (a) Grade 7 to Grade 10 students at Lakes City Christian School (b) students who have access to cellphones.

A standardized test was used to gather the desired data for the study. The researcher used a self-made mathematics achievement test composed of 40 multiple-choice questions.

Pilot testing of the questionnaire was carried out by the researcher in an effort to find the reliability. The researcher designed a pre-version of the questionnaire to obtain demographic data and students' current knowledge of mathematics. Pilot testing was carried out on some students to perform a test of the reliability of the questionnaire. Then the Principal of Lakes City Christian School was later asked for permission since moral concerns were of foremost priority in human subjects' research, since that would be your justification for conducting the study. This was so that the study can align with the values and purpose of the school.

Furthermore, informed consent and assent were also derived from students themselves as well as from guardians or parents. The study was described in writing, its purpose, procedures, risk, and potential benefit. Participants were free to withdraw at any time without penalty. With all the approvals and consents being in order, the study commenced and was conducted through a pretest in mathematics. The pretest was a test of the math ability level of the students. Brief study clips were created to explain and reinforce mathematics concepts. The short video clips were prepared to grab the attention of the learners and accommodate different learning styles to increase active learning of the content. Participants were given a post-test in mathematics after the intervention session to attempt their performance after being exposed to the intervention.

Pretest and post-test data taken were strictly subjected to statistical analysis. Statistical comparison of pretest and post-test was conducted to determine if any difference in the product of learning occurred. Statistical outcomes were compared to determine the level to which student performance was impacted by the intervention. Whether there was a difference in the outcome of learning determined if or not the utilization of short-form videos created by teachers had an effect on mathematical comprehension and retention.

RESULTS AND DISCUSSION

This chapter presents the results, analysis, and discussion of the findings regarding the effectiveness of teacher-made short-form videos on students' academic performance in Mathematics. A total of 237 students from Grades 7 to 10 participated in the study, and both pre-tests and post-tests were conducted to measure their performance before and after the integration of the teacher-made short-form videos. The methodology included the use of four teacher-designed video lessons tailored to specific grade-level competencies, with each video running between 6 to 10 minutes. These videos served as supplementary instructional materials designed to enhance comprehension and engagement while aligning closely with the Department of Education's Mathematics curriculum. The pre-test and post-test scores provide the empirical basis for evaluating the intervention's impact.

The results revealed a marked improvement in student performance across all grade levels. For Grade 7, the pre-test scores indicated that a majority of students (51%) fell into the

“Fairly Satisfactory” category, while only 3% achieved “Very Satisfactory” and none reached “Excellent.” After the intervention, the distribution shifted dramatically, with 52% achieving “Very Satisfactory” and 19% attaining “Excellent.” Only 3% remained in the “Fairly Satisfactory” bracket, and no students were left in the “Below Satisfactory” range, showing the strong impact of the intervention on learning outcomes.

In Grade 8, students initially performed modestly, with 39% in the “Fairly Satisfactory” category and no students reaching either “Very Satisfactory” or “Excellent.” Following the use of short-form videos, 43% of students reached “Very Satisfactory,” and 6% achieved “Excellent.” The “Fairly Satisfactory” category decreased to just 3%, and no students were left in the “Below Satisfactory” level. This shift demonstrates how the intervention successfully elevated students’ performance and enabled them to move into higher achievement categories.

The Grade 9 results also illustrated significant improvement. Before the intervention, 44% of students were classified as “Fairly Satisfactory,” while none were rated “Very Satisfactory” or “Excellent.” After the use of teacher-made short-form videos, 38% attained “Very Satisfactory” and 4% achieved “Excellent.” Only 6% remained “Fairly Satisfactory,” compared to 44% before the intervention. This outcome confirms the effectiveness of the strategy in moving students away from lower achievement bands and into higher ones.

For Grade 10, the intervention yielded the most pronounced results. Initially, 58% of students were categorized as “Fairly Satisfactory,” with just 1% considered “Very Satisfactory” and none “Excellent.” After the videos were introduced, 52% of students achieved “Very Satisfactory,” while 14% reached “Excellent.” The percentage of students in the “Fairly Satisfactory” category declined sharply to only 4%. These results strongly suggest that the intervention was highly effective in addressing difficulties in more complex Mathematics concepts such as algebra and permutations.

Overall, the findings align with both local and international literature on the role of short-form videos in education. Zhu et al. (2022) found that such videos significantly improved engagement and exam performance in STEM subjects, while Afify (2020) reported that shorter, interactive videos were linked to higher cognitive engagement and retention. Similarly, Dejecacion (2022) highlighted the contextual and personal connection that teacher-created videos foster, which enhances student engagement. The improvements across all grade levels in this study support these assertions and validate the application of Cognitive Load Theory, which posits that breaking information into smaller, digestible chunks reduces extraneous cognitive burden while enhancing learning efficiency.

The statistical analysis further supports these findings. Results of the paired-sample t-tests revealed statistically significant differences between pre-test and post-test scores in all grade levels. Grade 7 showed a t-value of -30.883 with a p-value of .000, Grade 8 had a t-value of -19.420 with a p-value of .000, Grade 9 reported a t-value of -23.372 with a p-value of .000, and Grade 10 produced a t-value of -23.204 with a p-value of .000. All results were significant at $p < 0.05$, indicating that the use of teacher-made short-form videos had a substantial positive effect on students’ Mathematics performance across all grade levels. These results are consistent with the findings of Afify (2020), who emphasized the benefits of concise video formats for retention, and Vergara-Barberá et al. (2023), who argued that the multimedia nature of short videos keeps learners engaged and actively involved.

For Grade 8 students, who often transition to more advanced Mathematics topics, the improvement aligns with Han's (2020) findings that video elements such as animations reduce cognitive load and facilitate step-by-step understanding. Grade 9 improvements can be attributed to the ability of short-form videos to allow learners to revisit complex concepts independently, as suggested by He et al. (2021), which is vital in reducing academic stress. Grade 10 results also mirror the conclusions of Karpicke et al. (2024) and Cassidy (2025), who identified that high-quality multimedia content fosters critical thinking and makes abstract concepts more accessible.

Taken together, the results demonstrate that teacher-made short-form videos consistently improve student performance in Mathematics, not only by raising achievement levels but also by sustaining engagement and comprehension. The consistent statistical significance across all four grade levels underscores the intervention's effectiveness, echoing broader literature (Dejecacion, 2022; Li & Yu, 2021; uQualio, 2025) that supports the value of short-form videos in promoting motivation, reducing cognitive overload, and enhancing comprehension. The findings highlight that teacher-made short-form videos, when thoughtfully designed and aligned with curriculum goals, can be an effective and innovative tool in Mathematics education, helping students achieve better outcomes in one of the most challenging academic subjects.

CONCLUSION

This study investigated the effectiveness of teacher-made short-form video materials on the learning achievement of Grade 7 to Grade 10 students in Mathematics at Lakes City Christian School. Employing a quasi-experimental design with pre-test and post-test measures, the research revealed that prior to the intervention, the majority of students performed within the Fairly Satisfactory (8–15) and Satisfactory (16–23) ranges, indicating modest initial levels of mathematical proficiency. After exposure to the teacher-made short-form videos, however, a significant number of students advanced to the Very Satisfactory (24–31) and Excellent (32–40) categories. Statistical analysis using t-tests confirmed that these improvements were significant at $p < 0.05$, thereby affirming that the use of teacher-made short-form videos had a positive and meaningful impact on students' academic performance in Mathematics.

From these findings, it can be concluded that teacher-prepared short-form instructional videos effectively enhanced student engagement, understanding, and problem-solving abilities in Mathematics. The concise and organized format of these videos contributed to greater retention of knowledge and improved academic achievement, serving as an effective supplement to traditional instruction. The results also showed alignment with contemporary student learning patterns and technological trends, demonstrating the practicality of integrating multimedia into pedagogy. Ultimately, the statistical evidence led to the rejection of the null hypothesis, confirming that teacher-made short-form videos brought about significant improvements in student learning outcomes in Mathematics.

The results of this study lead to several key recommendations. To strengthen Mathematics instruction, teachers are encouraged to design and integrate short-form videos ranging from 30 seconds to 10 minutes, simplifying complex topics into manageable, visually stimulating segments. By embedding features such as voice-overs, animations, transitions, and visual text, teachers can bridge the gap between abstract concepts and concrete understanding, thereby fostering deeper student engagement. Furthermore, professional development programs

should be developed to focus on multimedia learning theory and video production skills. Equipping teachers with competencies in storytelling, editing, animation, and sound integration will enable them to craft high-quality educational videos that capture and sustain learner interest.

Collaboration among educators is also recommended to ensure broader access and innovation in video-based instruction. Establishing shared platforms or repositories where teachers can upload, review, and adapt short-form videos across grade levels and subject areas would foster a culture of collaboration, coherence, and efficiency. Such initiatives could reduce preparation time while enhancing the quality and consistency of instructional practices. Finally, the study encourages further research to examine both the short- and long-term impacts of teacher-made short-form videos on knowledge retention. Future inquiries may also expand to other subject areas beyond Mathematics and explore how design features such as pacing, interactivity, and visual clarity influence learning outcomes. These directions would provide deeper insight into the pedagogical value of teacher-made short-form videos and strengthen their role in technology-enhanced classrooms.

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