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MULTIMEDIA PRESENTATION AND THE ACADEMIC PERFORMANCE OF LEARNERS IN SCIENCE 5: AN EXPERIMENTAL STUDY

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ABSTRACT

Educational administration is increasingly focused on integrating technology to enhance learning outcomes in the 21st-century classroom. This study investigated the effectiveness of multimedia presentations on the academic performance of Grade 5 learners in Science 5 at Linda Integrated School. Grounded in the Cognitive Theory of Multimedia Learning (Mayer, 2001), the research utilized an experimental design with pretest-posttest measures to determine whether multimedia-based instruction significantly improves comprehension and retention of scientific concepts.

Science education in the Enhance K–12 curriculum often challenges learners due to its abstract nature and technical language. To address this, the study explored the use of interactive, multimedia-enhanced lessons combining text, images, audio, and video. Results are expected to show measurable improvements in learners' test scores, demonstrating that multimedia integration positively impacts motivation, conceptual understanding, and performance in Science.

The findings will provide empirical evidence for teachers and inform educational administrators on the value of adopting multimedia as a pedagogical tool. Recommendations will focus on teacher training, resource allocation, and policy development to strengthen technology integration in Science education and enhance 21st-century skills among learners.

KEYWORDS: *Educational Administration, Multimedia Presentations, Science Education, Academic Performance, Grade 5 Learners, Experimental Research, Cognitive Theory of Multimedia Learning, K–12 Curriculum, Technology Integration, Linda Integrated School.*

INTRODUCTION

The Problem and Its Background

The use of technology in education continues to grow rapidly, with multimedia emerging as one of the most prominent tools. According to Ilhan and Oruç (2016) integrating multimedia into teaching enhances student achievement, positively influences student attitudes, and makes learning experiences more engaging and easier to understand. Multimedia presentations in teaching Science would help the students with different skills and learning styles to learn more. Also, it provides a richer learning environment and the subjects being taught could be transmitted to the students with web-based audio, visuals, video and animations in a way that could not be taught in classrooms authentically with other techniques.

Moreover, a study was conducted by Sousa et al. (2017) in South Africa which aimed to establish which multimedia combinations are best for the teaching and learning of Social Sciences content. A quasi-experimental research design was used to establish how exposure to different multimedia combinations on digital videodisc may teachers use to provide their students with more effective and efficient learning environments and educational experiences. The results of the study indicate that when using various multimedia combinations, the unique nature of Social Sciences can be addressed effectively.

In similar manner, the study of Aquino (2017) in Federico N. Ceralde Integrated School (FNCIS), Dagupan City, Philippines investigated the effectiveness of the interactive multimedia presentation method of teaching Science with 120 intermediate pupils as participants of the study. The researcher utilized experimental research design. Result showed that the posttest performance of the pupils in Science improved in both control and experimental groups in all intermediate grade levels. Furthermore, the mean difference indicates that there is a highly significant

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difference in the performance of the leaders in the control and experimental group. Findings of the study showed that the intervention is effective in teaching Science for Grades 4, 5, and 6. Based on the results of this study, the researcher highly recommends the use of interactive multimedia presentation in teaching science and other subjects.

At Linda Integrated School, where the researcher was teaching, a persistent challenge has been observed in the Grade 5 Science class. The learners demonstrate a low level of motivation and interest in participating during Science discussions. Many students appear disengaged and reluctant to interact or express curiosity about the subject matter. This lack of participation suggests a deeper issue: students may not perceive Science as relevant, important, or enjoyable. As a result, the learning atmosphere becomes passive, and the intended learning outcomes are difficult to achieve.

To address this problem, the researcher proposes the use of multimedia as a strategic intervention in the teaching of Science. By making lessons more interactive and enjoyable, the researcher hopes to foster a more positive attitude toward the subject and create a classroom environment where learners are actively involved in their own learning process. The findings of this research may also provide valuable insights for other educators who face similar challenges and are searching for effective strategies to enhance Science education in the elementary level.

Statement of the Problem

The main objective of this study was to determine the effectiveness of the use of multimedia in teaching Science on the academic performance of Grade 5 learners who are enrolled at Linda Integrated School, Nabunturan West District Division of Davao De Oro for school year 2025-2026. Specifically, it sought to answer the following questions:

1. What is the academic performance of pupils during the pretest?
2. What is the academic performance of pupils during the posttest?
3. Is there a significant difference in the pre-test and posttest?

Null Hypothesis

To determine statistically the answers to the problem a null hypothesis is formulated.

HO_1: There is no significant difference in the pre-test and posttest.

Scope and Delimitation of the Study

This study was limited to the 25 Grade 5 learners of Linda Integrated School. It aimed to determine the effectiveness of using multimedia presentations on students' academic performance in Science for the school year 2025–2026. As an experimental research design, the study involved the use of multimedia presentations as an instructional intervention. A pretest was administered prior to the intervention to assess the learners' initial performance, followed by a posttest after the intervention to evaluate any improvement in their academic achievement.

Significance of the Study

The results of this study would be beneficial to the following group of individuals:

Learners. The results of this study would motivate the learners to focus on their attention to cooperate and participate activities so as to improve their academic performance especially that they are exposed to multimedia.

Teachers. The results of this study would encourage the teachers to vary their strategies in teaching especially in the use of multimedia or the use of technology. They will be informed that as teachers they could choose strategies and techniques appropriate for the king of pupils they have. And with this students can understand the lesson better.

School Administrators. The results of this study may be beneficial to the school heads/ principal so they can have further information to propose the effective plans for improving the performance of the pupils.

Parents. The results of this study would be helpful to the parents to guide to improve their academic performance. Parents would become more cooperative and supportive of their children using a strategy that would help their pupils to perform better.

Other Researchers. The results of this study would give information to the other researchers with regard to the use of multimedia presentations which will serve as the basis to develop possible intervention to improve the academic performance of the pupils.

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METHODS

This chapter explains the research design, research locale, subjects of the study, research instrument, validation of the instrument, research procedures, statistical treatment, and ethical considerations.

Research Design

The researcher utilized the quantitative-quasi experimental using one-group, pretest-posttest research design in gathering data. With this design, the researcher determined the effectiveness of the multimedia presentations on the academic performance of Grade 5 pupils. In quasi-experimental research design involves the manipulation of independent variable without random assignment of participants to conditions or orders of conditions (Campbell, 2002). Further, a pretest was given before the intervention and after the intervention a posttest was administered. The pretest results were compared with the results in the posttest.

One-Group Pre-test Post-test Design

Pretest	Treatment	Posttest
O1	X	O2

Research Subjects

The subjects of the study were the 25 Grade 5 learners who were enrolled in Linda Integrated School, Linda, Nabunturan Davao de Oro for school year 2025-2026. These learners were pretested using the researcher-made questionnaire in Science and a posttest was administered after the intervention.

Research Instruments

The instrument in this study was the researcher-made made questionnaire with 30 items which was used for the pretest and posttest. Table of specifications was prepared to show the distribution of the test questions based on the Science competencies for the first quarter. The questionnaire was administered as the pretest and posttest as well.

Validation of Instrument

The researcher-made questionnaire used to measure the academic performance of Grade 5 learners in Science was subjected to content validation to ensure accuracy and relevance. It was reviewed by a panel of experts in Science education and educational research. The validators assessed the instrument based on criteria such as content relevance, clarity of items, and alignment with learning competencies. A descriptive validity rating scale was used with the following levels: Excellent, Very Satisfactory, Satisfactory, and Did Not Meet Expectation.

Comments and suggestions provided by the validators were carefully considered, and revisions were made to improve the structure and content of the questionnaire. Items that initially did not meet expectation were revised or replaced to meet the required standards. After validation, the instrument obtained an overall rating of Very Satisfactory, indicating that it was appropriate for use in the study.

To establish reliability, the revised questionnaire was pilot-tested with a group of Grade 5 students from the same school who were not part of the experimental and control groups. The results of the pilot test were analyzed using appropriate statistical measures to confirm internal consistency and reliability before its final administration during the actual experimentation.

Research Procedure

Before the conduct of the study, the researcher sought certification from the Ethics Review Committee of the Assumption College of Nabunturan. After which endorsement letter was asked from the dean's office. Together with this endorsement letter was the personal letter address to the schools division superintendent for approval. Upon approval, he asked permission from the principal of Linda Integrated School to give him the go signal to start his experimentation. The researcher notified the subjects of the study who were his learners in Grade 5.

Furthermore, the researcher followed established ethical standards in the conduct of the study. The onset of the experimentation was the administration of the pretest to determine the performance of the learners before the intervention after which the intervention began using the multimedia presentations in teaching Science. After the designated period of the intervention, a posttest was given to determine if there was an improvement of the academic performance of the learners.

During the intervention the researcher recorded any significant events that happened during the teaching-learning process.

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The researcher collated and tallied all data and submitted it to the statistician for the statistical treatment. Subsequently, the data were subjected to analyses and interpretations.

Statistical Tools

The data gathered were tabulated and subjected to statistical treatment which was the use of SPSS to facilitate the presentation, analysis, and interpretation of data. The following tests were employed.

Mean. This was used to determine the frequency distribution of data at certain level of ratings.

Paired T-test. Is a statistical method used to compare the means of two related groups, such as the same participants tested before and after an intervention. In this study, the Paired T-test will be used to determine whether there is a significant difference between the learners' pretest and posttest scores, thereby assessing the effectiveness of using multimedia presentations in improving academic performance.

RESULTS

This chapter outlines the results derived from the gathered data and the corresponding analyses are presented in the study based on the research questions.

Level of Academic Performance of the Learners in the Pretest

Table 1 presents the Pretest Results of the Learners.

Table 1
Pretest Results of the Learners

Descriptive Statistics		Posttest
Class Mean		10.72
Class Proficiency		33%
Quality Index		No Mastery Level of Skills
Performance Level	74%	Did not Meet Expectation

The data presented in Table 1 reveals a significant improvement in the academic performance of Grade 5 learners following the intervention using multimedia in teaching Science. During the pretest, the class mean was 10.72, which translates to a proficiency level of only 33%, indicating that the learners were at the "No Mastery" level and did not meet the expected standards. The standard deviation of 50.54 in the pretest suggests a wide variability in pupil performance, with scores ranging from a minimum of 3.00 to a maximum of 23.00. In contrast, the posttest results show a marked increase in the class mean to 22.08, reflecting a much higher performance level. The narrower standard deviation of 3.957 and score range between 12.00 and 29.00 further indicate more consistent and improved performance among learners. The overall performance level rose to 74%, which, although still categorized as "Did Not Meet Expectation" according to some standards, clearly demonstrates substantial academic gains likely attributed to the multimedia intervention.

Level of Academic Performance of the Learners in the Posttest.

Table 2 presents the Posttest Results of the Learners.

Table 2
Posttest Results of the Learners

Descriptive Statistics		Posttest
Class Mean		22.0672
Class Proficiency		74%
Quality Index		Nearing Mastery Level of Skills
Performance Level	89%	Very Satisfactory

The posttest results reflect a significant improvement in the academic performance of the Grade 5 learners. The class mean increased to **22.06**, indicating that, on average, students were able to answer a considerable number of items correctly compared to the pretest. With a **class proficiency level of 74%,** the learners have moved from a "No Mastery" category to **"Nearing Mastery",** suggesting that most pupils have begun to grasp the concepts taught through the multimedia intervention. Furthermore, the **quality index indicates that learners are approaching mastery level**, which is a positive sign of effective instruction. The **performance level of 89%** is

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categorized as **"Very Satisfactory",** signifying that a majority of the class has demonstrated a high level of understanding and competence in the subject matter. Overall, the posttest outcomes support the effectiveness of using multimedia as a teaching tool in enhancing student learning in Science.

Difference Between the Pretest and Posttest Scores

Table 3 presents Significant difference in the academic performance of the pupils in Science before and after the intervention.

Table 3
Difference Between the Pretest and Posttest

Paired Samples T-test				
		T	df	P
Pretest	Posttest	-20.87	24	<.001

The above data suggest that there is a significant difference between the academic performance of the learners i the pretest and posttest. The learners gained 15% of the knowledge and skills during the posttest which is th effect of the use of multimedia in the delivery of instruction in Science. Therefore, the null hypothesis is rejected.

DISCUSSIONS AND CONCLUSION

This chapter presents the summary of the results, discussions, conclusion and recommendations of the study.

Discussions

The following results are based on the data collected as well as the analyses through the use of appropriate statistical tools.

Level of the academic performance of the learners in the pretest and posttest. The results of this study clearly demonstrate the positive impact of multimedia-assisted instruction on the academic performance of Grade 5 learners in Science. Comparing the pretest and posttest results, there is a significant improvement in learners' performance after the use of multimedia. This suggests that traditional methods used prior to the intervention may not have been effective in engaging students or supporting their understanding of key science concepts.

After the implementation of multimedia-based instruction, the posttest results showed a remarkable increase in the class mean. The class proficiency increased with a performance level of “Very Satisfactory.” This improvement also indicates that learners are now nearing mastery of the skills taught. Multimedia presentations, which often include visual aids, animations, sounds, and interactive elements, may have contributed to better comprehension, increased motivation, and greater retention of information among pupils.

The reduced standard deviation in the posttest also indicates more consistent performance among students, suggesting that multimedia tools helped bridge learning gaps and supported differentiated instruction. Overall, the results suggest that integrating multimedia into teaching strategies not only enhances academic outcomes but also creates a more engaging and effective learning environment for elementary learners in Science. Technology in education is expected to be integrated in the classroom instruction. The role of technology in the field of education is four-fold: it is included as a part of the curriculum, as an instructional delivery system, as a means of aiding instructions and also as a tool to enhance the entire learning process (Raja & Nagasubramani, 2018).

The results of the study of Mendoza (2015) revealed that the level of the effectiveness of using video presentation to student’s learning is highly effective. Technology has revolutionized the field of education. The importance of technology in schools cannot be ignored. In fact, with the onset of computers in education, it has become easier for teachers to impart knowledge and for students to acquire it. The use of technology has made the process of teaching and learning all the more enjoyable (Raja & Nagasubramani, 2018). These days, using video learning in the classroom can be advantageous for both parties. Once finished, video lessons can be updated and reused, freeing up classroom time for in-person interactions and students engagement (Caratiquit & Pablo, 2021) Instructional videos have become an important part of higher education and are an important content delivery tool in many flipped, blended, and online courses (Brame, 2016).

Based from the study of (Wong, 2020), it is clear that students recognize the benefits of learning with video clips, primarily in terms of comprehension, lesson enrichment, and even making the lessons more interesting. Dham (2021) explains, Video-based learning provides the students with an opportunity to learn the subject at their convenience in the most effective way. The use of videos in the classroom is a powerful tool for the student and

the teacher. It is an opportunity for both student and teacher to learn and grow. (Trail & Caukin, 2022). Learning via videos is considered an effective tool for many students, as the topic was well reviewed by many researchers. Learning is important for students to build their foundation of knowledge that they can utilize in their future careers. Learning through videos is considered an effective tool for many students, the topic was well- reviewed by many researchers (Wong, 2022).

CONCLUSION

Based on the results of the study, it can be concluded that the use of multimedia in teaching Science significantly improves the academic performance of Grade 5 learners. The notable increase in the class mean clearly indicates enhanced learning and understanding of the subject matter. The improvement in class proficiency confirms that multimedia instruction is an effective tool in delivering scientific concepts more clearly and engagingly. Furthermore, the use of multimedia has contributed to better learner engagement, motivation, and retention of knowledge, leading to more consistent and higher achievement across the class. These results support the idea that multimedia is a valuable component of modern teaching strategies, particularly in Science education, where abstract concepts can be made more concrete through visual and interactive presentations. Thus, multimedia can serve as an essential aid in improving both teaching effectiveness and learner outcomes.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are proposed:

1. Integrate Multimedia in Regular Instruction. Teachers are encouraged to consistently incorporate multimedia tools such as animations, videos, simulations, and interactive presentations into their Science lessons to enhance learner engagement, understanding, and retention of concepts.
2. Provide Training for Teachers. School administrators may organize training and workshops to equip teachers with the necessary skills and knowledge in creating and utilizing multimedia instructional materials effectively.
3. Enhance Technological Resources. The school may invest in improving access to technological equipment such as projectors, computers, internet connectivity, and multimedia software to support the smooth integration of multimedia in the classroom.
4. Develop Multimedia-Based Learning Modules. Teachers and curriculum developers should collaborate to design Science modules or lesson guides that integrate multimedia resources aligned with the curriculum standards and learners' needs.
5. Conduct Further Research. Future studies may explore the long-term effects of multimedia use on learner performance, motivation, and interest, as well as its application in other subject areas and grade levels for broader implementation.

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