



# THE EFFECTS OF MULTIMEDIA-BASED INSTRUCTION TOWARDS THE ENGLISH PERFORMANCE OF GRADE 10 STUDENTS

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## ABSTRACT

Teachers must place a major focus on teaching students' teamwork, critical thinking, and communication skills while also emphasizing the 21st century learning style to enhance the educational system. This study aimed to determine how multimedia may be used to increase student engagement and active learning in English classes. The Grade 10 students at Sta. Maria National High School, Sta. Maria, Trento, and Agusan del Sur served as the study's subjects. The experimental and control groups both received pre- and post-tests. The experimental group got multimedia-based training, while the control group was taught using traditional methods such as chalk and talk. Following the intervention, students' academic performance greatly improved. The students responded favorably to the utilization of a PowerPoint presentation, video, audio, flashcards, and charts as a component of a multimedia-based education program. As a result, it was discovered that teaching English 10 effectively involves employing multimedia-based training. The results of this study thus advise teachers, particularly at the secondary level, to incorporate the use of multimedia techniques in English topics to increase the students' involvement and active learning. This complies with the requirements of contemporary pedagogy, which further promotes an atmosphere of active learning in the classroom.

**KEYWORDS:** english, multimedia, powerpoint presentation, academic performance, quasi-experimental

## INTRODUCTION

Multimedia is multi-sensory and engages the audience's senses in several ways at once. Teachers can manage the information flow and content because of its interactive character. When correctly planned, the use of multimedia in education has a favorable impact on academic attainment when compared to traditional instruction. It might be argued that the usage of multimedia facilitates and objectifies learning since it exposes learners to a variety of technological aspects and fulfills a variety of emotional needs. (Akkoyunlu & Yilmaz, 2005). In contrast with this, due to a variety of factors, the use of multimedia in classroom instruction is relatively restricted in Pakistan. These factors include the expensive cost of computers, multimedia, and other related infrastructure, as well as a shortage of technical staff and teachers who are proficient with computers. Another issue is how teachers feel about its utilization. He claims that using it improves knowledge, develops memorization skills, and raises students' interest levels. Different students learn in different ways, and multimedia offers several learning modalities at once to accommodate this (Gilakjani, 2012).

Similarly, an experimental study was conducted in Dagupan City during the first and second grading periods of school year 2016-2017. Result showed that the posttest performance of the students improved in the experimental group. The findings of

the study also showed that the intervention is effective (Aquino, 2017).

The Department of Education in the Philippines aims to reactivate both public and private schools to transform them into dynamic, inventive, collaborative learning environments where students may develop their motivation, enquiring minds, and creative abilities as learners using interactive multimedia. In multimedia, the students will benefit from being able to connect with the broad, information-rich networked world. They can gain a broad knowledge base and a global perspective as a result. Also, it gives students the tools they need to build a creative mind as well as the talents to critically and thoughtfully seek out, take in, analyze, manage, and present information. Moreover, they will be able to produce novel ideas and goods. Furthermore, grow the students' self-learning practices to foster the mind set and capacity for lifelong learning (DepEd, 2008).

In Sta. Maria National High School where the researcher is presently teaching, has exerted its effort to respond to the needs and demands of time. In this regard, Sta. Maria National High School implemented the digitized class program through the approved Learning Continuity Plan. Teachers are now enforced to use the multimedia in teaching to cater the needs of today's learners. With this, the researcher is encouraged to conduct this study to find out if multimedia can be a tool in addressing the learning difficulties of students and if students



can acquire the learning skills necessary for them to reach their full potential.

### Objectives Of the Study

The objectives of this study are as follows:

1. To assess the academic performance of students in English 10 using multimedia-based instructional tools, including PowerPoint presentations, videos, audios, flashcards, and charts, by comparing their pretest scores between the control and experimental groups.
2. To evaluate the academic performance of students in English 10 using multimedia-based instructional tools by comparing their posttest scores between the control and experimental groups.
3. To determine if there is a significant difference in the academic performance between the control and experimental groups, based on their post-test scores, to understand the effectiveness of using multimedia-based instructional tools for learning English 10.

### REVIEW OF RELATED LITERATURE

The reviewed articles and journal publications collectively underscore the significance of multimedia learning as an effective instructional tool in the classroom, incorporating various technological elements like video, music, pictures, drawings, and text (Fouda, 2008). Studies by Taj et al. (2017) and Gonen (2018) demonstrate the positive impact of technology integration, such as computers and mobile phones, on students' vocabulary performance. Moreover, research by Montero et al. (2018) and Nova et al. (2017) emphasizes the benefits of using videos to enhance vocabulary learning. Game-based learning also emerges as a highly effective method, promoting social skills, higher-order thinking, and topic competency (Thomas & Brown, 2011). Games in language learning not only enhance motivation and authentic communication practices (Macedonia, 2005) but also increase students' motivation and incidental language learning (Enayat & Haghighatpasand, 2017).

Furthermore, incorporating games and education results in enjoyable and educational learning experiences (Donmus, 2010). Online games facilitate target language production (Peterson, 2016), and their use boosts motivation, interest, focus, and involvement in the learning process (Katemba, 2019). Moreover, games have the potential to reduce anxiety and fear of making mistakes, allowing students to focus on creativity and problem-solving skills (Macedonia, 2005; Zou et al., 2019). This positive impact on motivation and engagement is shown to accelerate and enhance the language learning process (Liu & Chu, 2010; Hwang et al., 2016).

The research conducted by Taebenu and Katemba (2021); Katemba and Sinuhaji (2021) reinforces the substantial impact of using online games to teach vocabulary. To further improve the effect of multimedia instruction, Mayer (2005) advocates

for a constructivist eLearning approach that provides appropriate scaffolding to reduce cognitive load and promote active learning. Additionally, the importance of considering students' cognitive and neurological development, differentiated instruction, and the influence of the environment on learning is emphasized (Jennings et al., 2017).

Nweke et al. (2013) demonstrate that multimedia enhances students' attention and makes learning more efficient and flexible. Furthermore, Mayer's design principles for cognitive multimedia learning aim to optimize content delivery and reduce extraneous cognitive load (Mayer, 2005). The self-explanation approach, as recommended by Roy and Chi (2005), proves beneficial in improving metacognitive skills and reducing cognitive load. However, in unstructured open-learning environments like distance education, learners' self-regulation and self-determination become crucial (De Jong, 2005).

Sociocultural interactions and external regulations are vital in enhancing intrinsic motivation and encouraging active participation in online learning experiences (Moore & Kearsley, 2011). Overall, the reviewed literature emphasizes the significant impact of multimedia learning, technology integration, game-based learning, and eLearning strategies on students' vocabulary performance, motivation, and overall learning experiences. It underscores the importance of considering cognitive load, self-regulation, and sociocultural interactions in educational settings, especially in distance learning environments.

The studies discussed in this research highlight the significance of multimedia-based technology and its impact on learning and digital reading performance. Mayer's theory of multimedia learning, expanded by Moreno's cognitive-affective theory of learning with media (CATLM), integrates interactive learning, simulations, and virtual reality with motivating and affective elements (Moreno, 2006). Similarly, Plass and Kaplan's Integrated Cognitive Affective Model of Learning with Multimedia (ICALM) emphasizes the role of emotion and motivation in multimedia learning (Plass & Kaplan, 2016). Incorporating motivating aspects through emotional design in multimedia learning has emerged as a crucial factor in boosting motivation over the past decade (Um et al., 2011). Uzun and Yildirim demonstrate an increase in positive emotions with more features of emotional design, while poorly planned multimedia presentations hinder learning (Uzun & Yildirim, 2018; Savoy et al., 2008).

On the other hand, using multimedia presentations has shown to enhance learning and create positive attitudes toward technology and instructors (Shigli et al., 2016). Bistrovic's development of activities and multimedia teaching aids that stimulate curiosity, exploration, and competition in learners further supports the importance of affective elements in



teaching (Bistrovic, 2017). Betcher and Lee find that students taught with interactive multimedia achieve better results, and Anyanwu, Gambari, and Ezenwa's study shows better performance with multimedia instruction (Betcher & Lee, 2009; Anyanwu et al., 2014). Digital reading also encourages social connections and makes the consumption of various textual forms more convenient through technology-based media (Firat & Koyuncu, 2021).

However, the research emphasizes the need for a comprehensive understanding of social media's effects on students' digital reading performance (Citrawati et al., 2021; Muls et al., 2020). Moreover, efforts to improve reading skills, such as providing engaging content and appropriate reading materials to cultivate reading habits and motivation, have been demonstrated to significantly impact students' overall learning outcomes (Bishop et al., 2016; Hjetland et al., 2019; Adlof & Hoggan, 2018). Thus, educators' effective methods and approaches in training students' reading skills, including speed-reading techniques, play a crucial role in enhancing their educational experiences (Adlof & Hoggan, 2018; Inawati & Sanjaya, 2018). Collectively, these studies underscore the importance of multimedia-based technology in shaping learning environments, improving reading skills, and promoting positive learning outcomes (Nurani et al., 2021).

Multimedia-based learning, which incorporates various media elements like text, graphics, video, and audio, has proven to be an effective model for promoting critical thinking and active engagement among students (Afrianti & Marlina, 2021; Castles et al., 2018). Chen & Liu (2008) further support this notion, emphasizing that multimedia, combining words and images, leads to better learning outcomes than using words alone. As educators shift towards a learner-centered approach, digital resources and technology play a significant role in transforming the learning environment, making it more interactive and engaging (Eady & Lockyer, 2013; Coleman et al., 2016). Multimedia tools have gained popularity due to their multiple advantages, supporting various learning tasks and styles (Guan et al., 2018; Alemdag & Cagiltay, 2018). The cognitive theory of multimedia learning highlights assumptions such as dual-channel processing, restricted capacity, and active information processing, elucidating how learners interact with instructional materials (Alemdag & Cagiltay, 2018).

Eye-tracking research has emerged as a valuable method to understand student interactions with multimedia learning tools, especially in higher education settings (Alemdag & Cagiltay, 2018). Additionally, evaluations of multimedia programs are crucial to ensure they meet their intended purposes (Kennedy & Judd, 2007). PowerPoint presentations and visual tools are particularly effective in enhancing student learning experiences (Ozaslan & Maden, 2013). Zhao (2007) reveals that teacher perspectives on technology integration influence its successful implementation in the classroom. The benefits and barriers of

computer-assisted language learning have been extensively examined, with advocates emphasizing its significance in second language learning (Han, 2008; AbuSeileek & Abu Sa'aleek, 2012). However, Koua (2012) reminds us of the controversies surrounding internet-based language learning, highlighting cultural and political considerations.

Furthermore, Riasati, Allahyar, and Tan (2012) discuss the advantages and barriers to the integration of technology in language instruction, underscoring the importance of understanding these factors to ensure successful implementation. Fu (2013) reviews research on ICT integration in education, examining its impact on teaching and learning. Overall, research on multimedia and technology in education showcases their potential benefits in enhancing learning experiences and outcomes, while also highlighting the need to address challenges and barriers in their implementation (Milovanovic et al., 2013; Fu, 2013).

## METHODOLOGY

### Research Design

This study employed a quasi-experimental research design in gathering the desired data from the performance of the students. It involves the manipulation of the independent variable to observe the effect on a dependent variable. It is used to establish causality in situations where the researcher is not able to randomly assign the subjects to groups for various reasons. The dependent variable of the study is observed in experimental as well as control groups before the intervention. While the experimental group receives treatment following which the post-test observation of the dependent variable is carried out for both groups to assess the effects of the intervention or treatment on the experimental group, Jaikumar (2018).

### Subjects of the Study

The subjects of the study were the Grade 10 students at Sta. Maria National High School for the school year 2022-2023. Two sections were selected of which the students were grouped heterogeneously to make sure that high-performing, average-performing, and low performing students were equally distributed in each section. This would ensure that no section is better than the other one. As part of the study, the researcher used a control and experimental group. The distribution of the students is presented in Table 1.

**Table 1**  
**Subjects of the Study**

GROUP	NO. OF SUBJECTS
Control	36
Experimental	36
Total	72

### Research Locale

This study was conducted at Sta. Maria National High School located at Barangay Sta. Maria, Municipality of Trento, Province of Agusan del Sur. It is a 20-minute drive from the



national road of Cuevas. The barangay is seated after the Simulaw River which is connected by the Monkayo River.

Trento is one of the 14 municipalities of Agusan del Sur of the region of CARAGA-XIII. Trento was formerly a barrio of Bunawan called Bahayan (referring to a lead sinker at the base of fishing net). Trento is one of the Municipalities in Northern Mindanao. It is located at the Southernmost part of the Province of Agusan del Sur, between 126°00 and 126°25 east longitude and 8°05 north latitude. It is bounded on the North by the Municipality of Bunawan of Agusan del Sur, on the south by the Municipality of Monkayo in Compostela Valley Province, on the east by the Province of Surigao del Sur and on the west by the Municipality of Sta. Josefa, Agusan del Sur.

The municipality is located between two cities, that of Davao City on the South which is 143 kilometers away and of Butuan City on its north which is about 141 kilometers away. These two cities serve as the nearest port of entry to Trento. Surigao City can also be a port of entry though it is quite farther than the two cities mentioned ahead.

Sta. Maria is one of the barangays of Trento, Agusan del Sur. Its population as determined by the 2020 Census was 4,735. Sta. Maria shares a common border with the following barangay(s): Cebolin, Trento, Agusan del Sur, San Roque, Trento, Agusan del Sur, San Ignacio, Trento, Agusan del Sur and Salvacion, Trento, Agusan del Sur.

Sta. Maria National High School is a medium school with curricular classes for Junior High School and Senior High School. It belongs to Trento District 4. It was previously known as Agusan del Sur National High School – Sta. Maria Extension. It was in June 1989. It was separated with the issuance of Republic Act 9988 converting it into an independent National High School on February 10, 2010.

**Research Instrument**

To achieve the research study's goal, a 30-item test as its main instrument was adapted from Ready to Print Self Learning Modules from the DepEd's National Education Portal for both control and experimental groups. A table of specifications was also prepared to determine the distribution of questions from the competencies taken. The questionnaire was checked by the panel of validators before its implementation. These modules were not given to the subjects of the study as to the validity of the results. After the experimental phase, a posttest was given to both groups. The coverage of the test was taken from the most essential competencies of science 9, Quarter 1 namely: Respiratory and Circulatory System, Effects of Lifestyle in the Function of Respiratory and Circulatory System, Non-Mendelian Patterns of Inheritance, Biodiversity and Evolution, and Ecosystem: Life Energy.

The results of the pretest and posttest were adapted by the descriptive equivalent from Deped Memo. No. 160, series of 2012.

**Research Procedures**

The following steps were followed in the gathering of data:

**Seeking Permission to Conduct the Study.** The researcher wrote a letter of permission to conduct the study to the Schools Division Superintendent, Division of Davao de Oro. A written letter of request was also given to the school head of Pasion National High School (PNHS) for formal consent. Upon receiving the confirmation from the authorities, a form explained the purpose of the study and assured volunteers that data collection, storage, and reporting techniques were protected by confidentiality and anonymity. The researcher took into consideration the standard health protocols following the advice of the local health officials to ensure the safety of the researcher, the students, and the parents as well.

**Administration and retrieval of the research instrument.** The researcher facilitated the distribution and administration of the pre-test, intervention program (game-based learning), and post-test. After which, the retrieval of the research instrument followed, and all responses would be encoded and stored in the personal computer of the researcher.

**Collection and tabulation of data.** The researcher collated and tallied all data and submitted it to the statistician for statistical treatment. Subsequently, the data would be subjected to analyses and interpretations.

**Statistical Treatment of Data**

The data obtained was tallied and tabulated. The statistical tools used to ensure the accuracy in the analyses and interpretations of the findings would be the following:

**Percentage.** This was used to determine the percentage distribution of the subjects.

**Mean.** This was used to determine the level of online gaming and the academic performance of students.

**T-test.** This was used in computing the significant difference between two groups of samples.

**RESULTS**

**Academic Performance of the Control and Experimental Groups as Reflected in their Pre-Test**

Table 2 shows the achievement level of the subjects before the intervention.

**Table 2**  
**Academic Performance of the Students in the Pre-Test**

Group	Number of Items	Mean	Descriptive Equivalent
Control	30	7.7	Very Low
Experimental	30	7.3	Very Low

The results show that during the pre-test, the students from the control group got a mean score of 7.7, while the experimental group got a mean score of 7.3. Both groups received a descriptive



equivalent of exceptionally low. It means that both groups had the same intellectual capacity before the treatment.

**Academic Performance of the Control and Experimental Groups as Reflected in their Post-Test**

**Table 3**

**Academic Performance of the Students in the Post-Test**

Group	Number of Items	Mean	Descriptive Equivalent
Control	30	16.7	Average
Experimental	30	25.3	Moving Towards Mastery

The academic performance of the control and experimental groups after the intervention is shown in Table 3. The results show that after the post-test, the students from the control group got a mean score of 16.7 with a descriptive equivalent of average while the experimental group got a mean score of 25.3, moving towards mastery. This shows that there is a positive impact of multimedia teaching on the students' academic performance.

**Difference in the Mean Scores of the Pretest between the Experimental and Control Groups**

Table 4 presents the difference of the mean scores of the pretest between the experimental and control groups.

**Table 4**

**Difference of the Mean Scores of the Pretest Between The Experimental and Control Groups**

Group	Number of Items	Mean	P-Value	Decision
Control	30	7.7	0.371	Not Significant
Experimental	30	7.3		

As shown in Table 4, the calculated p-value is 0.371, which suggest that there is no significant difference (at  $\alpha = 0.05$ ) between the mean scores of the experimental group and the control group before treatment. It means that both groups are compatible in their intellectual ability to learn the different competencies in English before the intervention.

**Difference in the Mean Scores of the Posttest of Experimental and Control Group**

Table 5 shows that there is a significant difference in the mean scores of the experimental group and the control group.

**Table 5**

**Difference of the Mean Scores of the Posttest Between The Experimental and Control Groups**

Group	Number of Items	Pre-Test	P-Value	Decision
Control	30	16.7	0.000	Significant
Experimental	30	25.3		

It is presented in Table 5 that the calculated p-value is 0.000 which is less than the significant level of 0.05 which suggests that there is a

significant difference in the achievement scores of the control and experimental groups after treatment.

Figure 1 shows the comparison between the academic performance of the experimental and control groups before and after treatment.

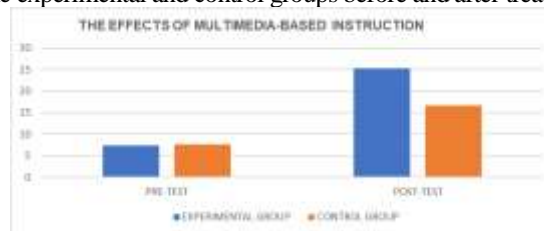


Figure 1 Academic Performances of the Experimental and Control Group

**Difference on Gain Scores Between Control and Experimental Group**

Table 6 and 7 present the result of the independent t-test that was conducted to test if there is a significant difference in the gain score of the control and experimental group.

**Table 6**

**Difference on Gain Scores of Control Group**

Group	Pre-test	Post-test	Gain Score	P-Value	Decision
Control	7.7	16.7	9.3	0.000	Significant

The table shows that the gain score of the Control Group is 9.3. The P-value is 0.000 which is greater than .05, this means that there is a significant difference between the gain scores. The chalk-and-talk method could still be used as an effective method in delivering lessons inside the classroom.

**Table 7**

**Difference on Gain Scores of Experimental Group**

Group	Pre-test	Post-test	Gain Score	P-Value	Decision
Experimental	7.3	25.3	17.6	0.000	Significant

Experimental Group's gain score is 17.6. The P-value is 0.000 which is greater than .05, this means that there is a significant difference between the gain scores. The multimedia-based instruction is effective because the gain score of the experimental group is greater compared to the control group. This indicates a significant increase in the academic performance of the experimental group. Thus, we reject the null hypothesis.

The above findings show that multimedia-based instruction is more effective to improve students' academic achievement in English learning. There is significant differences in the mean scores of the experimental and control groups in academic achievement tests after treatment. It means that treatment has a positive impact on the student's academic achievement. Multimedia-based instruction is an effective tool for learning English.



## DISCUSSIONS AND CONCLUSION

### Discussion

**Academic performance of the control and experimental groups as reflected in their pretest.** The pretest data analysis indicated that learners had similar intellectual capacity before the treatment (Jennings et al., 2017). Cognitive and neurological development plays a crucial role in students' learning abilities, considering factors like differentiated teaching, working memory, and cognitive strategies. Instructors utilize multimedia learning to design efficient teaching-learning activities, incorporating video, music, pictures, drawings, and text (Fouda, 2008). Multimedia instruction, based on the constructivist electronic learning approach, encourages active student involvement and provides scaffolding to reduce cognitive load (Mayer, 2005). This approach, known as multimedia-based learning, fosters active student engagement, critical thinking, and enjoyment throughout the learning process (Afrianti & Marlina, 2021). Through various media such as text, graphics, interactive video links, audio, video, photographs, and instructional animations, communication between teachers and students is facilitated (Castles et al., 2018).

**Academic Performance of the control and experimental groups as reflected in their posttest.** The posttest results indicated that the experimental group, with a mean score of 25.3, showed better learning outcomes compared to the control group, with a mean score of 16.7. These findings align with Lari (2014), who found that technology-based instruction significantly improved students' test results and motivation for learning. Ozaslan and Maden (2013) also supported the idea that visual presentation enhances subject learning. However, Savoy et al. (2008) cautioned against improperly planned multimedia presentations that may hinder learning. On the other hand, multimedia presentations have been shown to improve learning and foster positive attitudes towards technology and instructors (Shigli et al., 2016). Anyanwu, Gambari, and Ezenwa (2014) investigated the impact of multimedia education in geometry, with Animated Graphics with Narration with Text (AG+A+T) training leading to better performance than on-screen text for the control group. While multimedia technologies significantly improve learning (Milovanovic et al., 2013), there are also restrictions, such as unfriendly user interfaces and resource limitations (Al-Ajmi & Aljazzaf, 2020).

**Difference in the mean scores of the pretest between the experimental and control groups.** The calculated p-value is 0.371, which suggests that there is no significant difference between the mean scores of the experimental group and the control group before treatment. It means that both groups are compatible, and they have the same intellectual capacity.

**Difference in the mean scores of the posttest of experimental and control group.** The p-value of 0.000 suggests a significant difference in achievement scores between the control and

experimental groups after treatment. Students who interacted with multimedia resources outperformed those exposed to traditional lecture methods, consistent with Betcher and Lee (2009) and Anyanwu, Gambari, and Ezenwa's (2014) findings. Interactive media in teaching improve learning outcomes, stimulate interest, and facilitate information processing. The successful use of ICT in education shifts the learning environment to a student-centered approach, with teachers acting as facilitators. Ozaslan and Maden (2013) also found that visual aids, such as PowerPoint presentations, increased students' learning effectiveness and engagement.

### Conclusion

The findings above demonstrate that multimedia-based instruction is more successful than conventional chalk-and-talk education. It is more effective than the traditional method in assisting students in developing better cognitive skills. The difference in achievement score between the two groups is substantial. Through multimedia-based instruction, higher-order cognitive activities are strengthened, which also motivates learners to learn. With the use of animations, music, video clips, and audio clips, the lectures are made engaging and helpful.

The incorporation of multimedia teaching applications and practice teaching activities must occur at every stage of the teaching process, including the presupposition, the execution, the reflection, and the assessment. Only when educating students about integrated technology in the framework of transmitting information in this way are teachers permitted to support the development and enhancement of multimedia teaching programs.

### Recommendations

There is a paradigm shift in teaching because of technological advancement. Based on the above conclusion, it is recommended that:

1. For students' better academic achievement, multimedia-based instruction should be used in teaching English;
2. The study should be replicated in other disciplines as well at the elementary level;
3. Multimedia should be provided to schools for teaching English subjects;
4. Multimedia-based instruction moves us toward the constructivist approach of learning in which the learner plays an active role in the teaching and learning process, so teachers should be encouraged to teach English using multimedia.

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