

Effects of Vodcasts and Powerpoint Presentations on the Academic Performance and Motivation Among Grade 9 Biology Learners

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Abstract

This study aimed to determine the effects of vodcasts and PowerPoint presentations on learners' academic performance and motivation in Biology. This was conducted at Balubal National High School, Balubal, Cagayan de Oro City involving Grade 9 learners officially enrolled for School Year 2025-2026. A quasi-experimental pretest-posttest research design was employed to achieve the objectives of the study. Academic performance was measured using a 60-item researcher-made test covering the least mastered competencies in Biology, while learners' motivation was assessed using a validated survey questionnaire based on the ARCS (Attention, Relevance, Confidence, Satisfaction) motivation model.

Standard statistical procedures, including mean, standard deviation, and one-way analysis of covariance (ANCOVA), were used to analyse the data. The results showed that learners exposed to vodcast instruction achieved a very satisfactory level of academic performance, whereas those taught using PowerPoint attained a fairly satisfactory level. Moreover, a significant difference was observed between the two groups, indicating that vodcast instruction was more effective. Nevertheless, both instructional materials contributed to improvements in learners' academic performance. On the other hand, it was also demonstrated that after the implementation of the multimedia-based instruction, both groups attained a very highly motivated level. There was no significant difference in terms of motivation in Biology in both groups.

Introduction

Academic performance and motivation are key factors influencing learners' success in science education, shaping both their understanding of concepts and their level of engagement in learning. When learners exhibit low motivation, their academic performance is often adversely affected, resulting in poor comprehension and minimal engagement. In response to these challenges observed in the classroom, multimedia has emerged as a promising approach to enhance both academic performance and motivation. By incorporating text, images, videos, and audio, multimedia appeals to diverse learning styles and makes lessons more meaningful. This multimodal approach not only provides learners with alternative avenues for motivation but also supports varying levels of mastery which may contribute to improved academic performance.

Declining level of scientific literacy among learners is the persistent challenge in science education. In 2022, the Programme for International Student Assessment (PISA) highlighted a significant number of learners who struggle to interpret data, apply scientific knowledge, and provide valid explanations for

scientific phenomena. Only 25% of Filipino learners worldwide reached at least the baseline level of science proficiency, while a growing number failed to demonstrate even basic understanding (OECD, 2023a). Alarming, the Philippines ranked second to the last in science performance, with 78% of Filipino learners scoring below the minimum proficiency level (OECD, 2023b). Furthermore, the Second Congressional Commission on Education highlighted in its 2023 report that current science teaching methods remain content-heavy and outdated, limiting learners' engagement and critical thinking. EDCOM emphasized the need for learner-centered, technology-integrated instruction to raise scientific literacy levels and bridge the performance gap across schools (EDCOM II, 2023).

Likewise, schools in the Division of Cagayan de Oro City face similar instructional and resource-related barriers. Division monitoring reports revealed that mastery levels in Science have remained consistently low over the past five years, with average scores not exceeding 45% in major science components of National Achievement Test (NAT). Specifically, in Balubal National High School, learners exhibit low performance in Biology concepts such as the respiratory and circulatory systems which demand visualization and deep conceptual understanding. Moreover, based on the class proficiency report of the first-quarter Curriculum Management Support System (CMSS) in 2024, only 38% of Grade 9 learners demonstrated mastery of these concepts, with many learners struggling to comprehend processes like gas exchange in the lungs, blood circulation, and the impact of lifestyle on body systems. These learning gaps are attributed to the continued reliance on traditional methods that often fail to engage learners or make abstract biological concepts concrete.

The data clearly indicate that a significant number of Filipino learners consistently perform below the national average in key achievement assessments. This concerning pattern stresses a critical weakness in the education system where foundational knowledge and essential skills are not being effectively acquired. It becomes imperative for teachers and stakeholders to examine whether learners genuinely grasp the concepts being taught and whether these topics are making a measurable difference in learners' academic outcomes. Without targeted and meaningful interventions, this downward trend may persist, further impeding both the academic performance and motivation of Filipino learners and the overall quality of education in the country.

Multimedia-based instruction (MBI) bridges the gap between theory and comprehension. These are educational tools that integrates various forms of media to enhance the teaching and learning process (Utami et al., 2023). In science education, MBI plays a crucial role in simplifying complex concepts, making abstract topics more accessible through visual demonstrations and animations (Lai & Bower, 2020). Moreover, multimedia instruction supports differentiated learning, allowing learners to progress at their own pace and revisit content as needed, leading to better academic performance (Bajahzar, 2024). As digital tools continue to evolve, the integration of MBI remains a key strategy in modernizing education and enhancing learning outcomes.

Vodcast and PowerPoint were the multimedia-based instructions used in this study. Vodcast is a digital medium that combines video and audio elements to deliver content over the internet (Teixeira et al., 2019). It allows partitioning information in small capsules thereby creating new videos. These videos cover a lot of information well structured, with its own meaning, not too long and can be supplemented or related to other videos, without losing its meaning (Sevnanayan & Mohale, 2024). Moreover, research by Desai and Kulkarni (2022) found that shorter, well-structured instructional videos improve learner attention and completion rates, while Hernandez-Mena and Rojas (2025) emphasized that video podcasts are effective tools for reinforcing complex concepts in science education. Similarly, Weinert et al. (2024) highlighted

that interactive and well-designed educational videos promote active learning and deeper cognitive processing among learners.

In addition to vodcast, PowerPoint is another powerful multimedia tool that supports learning. This multimedia material helps structure and visualize instructional content in an organized and interactive manner (LeFebvre et al., 2022). This tool allows teachers to present key concepts using a combination of text, images, animations, and videos, making lessons more engaging and easier to follow (Nakiboğlu & Nakiboğlu, 2021). As cited by Alabi (2024) that visually supported presentations can help learners better understand complex concepts, particularly when visuals complement verbal explanations. Furthermore, Reddi et al. (2025) reported that PowerPoint presentations can increase learner interest and attentiveness compared to traditional lecture methods. However, in contrast to these positive outcomes, Zhao and Todd (2025) emphasized that its effectiveness largely depends on how it is utilized, as overly text-heavy slides or passive delivery may reduce engagement and limit deeper learning.

The researcher utilized multimedia-based instructional approaches, specifically vodcast and PowerPoint, to determine their effects in science education. While previous studies have established the general effectiveness of multimedia in enhancing learning, most of these studies treat multimedia as a single approach or examine tools in isolation, with limited direct comparison between specific modalities such as vodcast and PowerPoint. Moreover, there is a lack of research integrating these modalities within a structured instructional framework, particularly the 7Es model. To address this gap, the present study provides a direct comparison of vodcast and PowerPoint within the 7Es instructional framework. This study uniquely contributes to the existing literature by offering empirical evidence on how different multimedia modalities influence learners' academic performance and motivation in a real classroom setting.

Multimedia-Based Instructions and Academic Performance

Academic performance refers to the degree to which a learner, teacher, or educational institution achieves specific short-term or long-term learning objectives, typically evaluated through various forms of continuous assessment (Matunga, 2019). It reflects how learners interact with their studies and their ability to complete assigned tasks effectively. Academic performance encompasses the capacity to absorb, retain, and apply information while demonstrating understanding through verbal and written communication (Brew et al., 2021). It serves as a measure of a learner's progress, assessing their comprehension and skill development over time. Additionally, it provides insight into how well learners perform in comparison to their peers within the same academic domain. Ultimately, this acts as an essential indicator of a learner's success and mastery of subject matter (Khan, 2023).

Integrating multimedia-based instruction into educational settings has been shown to enhance learners' academic performance across various subjects. When examined more closely, these findings reveal both similarities and differences in the effectiveness of specific multimedia modalities, particularly vodcasts and PowerPoint presentations, in improving academic performance. Similarly, studies on vodcast and video-based instruction consistently demonstrate positive effects on learners' academic performance. For instance, a study by Paman-Viador and Dioso (2023) demonstrated that Grade 10 learners who received video-based instruction in English exhibited significant improvements in their academic performance compared to those taught through traditional methods. Moreover, study conducted by Taoc and Ramirez (2025), highlighted that learners' academic performance in the experimental group attained a very

satisfactory level after they were exposed to video-based. This implied that video-based instruction has potentially increased learners' academic performance.

In the field of science education, the application of multimedia and dynamic classroom integrated instruction has also yielded positive results. Espinoza et al. (2022) investigated the effects of instructional materials using videos on Grade 11 learners' biology achievement. The results indicated a significant improvement in learners' understanding of complex biological processes, such as respiration and photosynthesis. Moreover, Manginyog and Ambayon (2024) cited the positive impact of video materials on learners' achievements in literature classes. The study found that incorporating podcasts into the curriculum significantly enhanced learners' learning outcomes. This was supported by Dahlan et al. (2023) who mentioned that video resources presented varied and interactive content that addressed different learning preferences, thereby improving comprehension and retention of the learning content. This further suggest that multimedia-based instruction can be an effective strategy for enhancing academic performance of the learners.

On the other hand, PowerPoint presentations have also been found to support academic performance, particularly in organizing content and improving clarity of instruction. Research by Petrusse et al. (2024) indicates that PowerPoint can enhance learners' understanding when effectively designed with appropriate visuals and structured delivery. This was aligned by the study of Zamiri and Esmaili (2024) that academic performance involves the ability to comprehend and communicate knowledge effectively, as organized presentations can aid in knowledge acquisition. However, contrasting findings suggest that the effectiveness of PowerPoint is not always consistent. Ho and Mun (2026) found that text-heavy or poorly designed slides may hinder retention and reduce learner engagement, while Reddi et al. (2025) reported that PowerPoint does not necessarily result in higher academic performance compared to traditional teaching methods.

The reviewed studies consistently demonstrate that multimedia-based instruction enhances academic performance across various disciplines; however, they also reveal important variations and limitations when compared to the present study. Most prior research employed experimental or quasi-experimental designs similar to this study, involving secondary-level learners and focusing on subject-specific outcomes such science achievement. These similarities support the validity of using multimedia as an instructional intervention. Furthermore, while several studies reported positive effects, others suggest that the effect of multimedia depends largely on its design, implementation, and alignment with learning objectives, implying that not all multimedia approaches yield consistent improvements in performance. This highlights a research gap in determining which specific multimedia modality is more effective under the 7Es instructional model.

Multimedia-Based Instructions and Motivation

Motivation is a vital psychological construct that shapes the direction, intensity, and persistence of learners' engagement in academic contexts. It influences how learners initiate learning tasks, sustain effort, and respond to challenges in the classroom (Fuertes et al., 2023). John Keller's ARCS model conceptualizes motivation through four key domains: Attention, Relevance, Confidence, and Satisfaction, which together explain how instructional design can influence learners' sustained participation in learning tasks (Keller and Suzuki, 2021). The attention component emphasizes the importance of capturing and sustaining learners' interest through varied, stimulating, and interactive teaching strategies.

Mayer (2021) indicated that instructional approaches that incorporate novelty, multimedia elements, and problem-based activities are more effective in gaining learners' attention and reducing disengagement, particularly in content-heavy subjects.

The relevance domain highlights the need to connect learning content to learners' personal goals, real-life experiences, and future aspirations. When learners perceive instructional materials as meaningful and applicable to their lives, their motivation to participate in academic tasks increases significantly (Keller, 2010). Moreover, Howard et al. (2021) suggested that contextualized examples, real-world applications, and career-oriented learning tasks strengthen perceived relevance, leading to higher levels of engagement and persistence among learners. They added that making learning personally meaningful helps students develop a sense of purpose in their academic efforts, which supports sustained motivation over time.

The confidence component refers to learners' beliefs in their ability to succeed in learning tasks. Instructional practices that provide clear expectations, structured guidance, and timely feedback contribute to the development of learners' confidence and perceived competence (Keller, 2010). When learners experience small, achievable successes and receive constructive feedback, their self-beliefs improve, resulting in greater effort, perseverance, and willingness to engage with challenging academic tasks (Deci & Ryan, 2020). Designing learning experiences that are appropriately scaffolded helps learners build confidence and reduces anxiety toward complex concepts.

Meanwhile, satisfaction focuses on the positive feelings learners experience after accomplishing learning tasks and achieving goals. Satisfaction can be enhanced through intrinsic rewards, such as a sense of accomplishment and enjoyment, as well as extrinsic recognition, including praise and performance feedback (Keller, 2010). This implies that when learners feel that their efforts are acknowledged and that learning experiences are rewarding, they are more likely to maintain motivation and demonstrate continued engagement in future learning activities (Mayer, 2021). Instructional environments that provide meaningful feedback, opportunities for reflection, and reinforcement of learning outcomes contribute to higher levels of learner satisfaction and sustained academic motivation.

Learners are motivated to demonstrate their knowledge in creative ways when they can see how learning can become more learner-centered through the use of multimedia instruction in the classroom. In particular, vodcasts consistently demonstrates strong positive effects on motivation, particularly in terms of attention and satisfaction. For instance, Lange and Costley (2020) found that video-based learning enhances engagement through dynamic presentation, while Molina and Ramirez (2025) reported that there is a significant improvement in learners' motivation level after exposure to the instructional model, as measured across the ARCS dimensions. Furthermore, Wong and Adesope (2021) demonstrated that embedding emotionally appealing elements in video lessons positively influenced learners' motivation and comprehension. This approach not only captures learners' attention but also enhances a more profound connection with the content. As supported by Mayer (2021) that well-designed multimedia materials can enhance motivation by reducing cognitive load and promoting active processing of information. This is particularly relevant in subjects that involve complex concepts, where traditional teaching methods may fall short in sustaining learner's interest and motivation.

Chiu (2021) examined how digital tools support engagement in blended learning environment. This is also in conformity with the study of Marrie (2023) who explores at how learners' core psychological needs for autonomy, competence, and relatedness can be met by digital media, particularly mobile applications, to promote lifelong learning. The results emphasize the value of self-determination in educational settings by showing that learners exhibit higher levels of self-determination in educational contexts. In another

study conducted by Chiu (2022), he explained how incorporating technology into instruction can boost learners' motivation, emphasizing that when teachers engage learners in the learning process and provide meaningful rationales for the use of technology, learners develop a sense of self-determination leading to improved motivation.

On the other hand, PowerPoint presentations can also enhance learners' motivation, particularly in terms of relevance and confidence when properly designed. Jsrina and Siregar (2024) highlighted that organized and visually supported slides can help learners follow lessons more easily, thereby increasing their confidence and perceived value of the content. This supports the earlier claim that structured instructional materials contribute to learners' motivation when they clearly present information and connect it to learners' understanding. The attitude of a learner toward a task, regardless of its difficulty, is significantly affected by their level of motivation. After successfully completing challenging tasks, learners who are actively involved in learning will gain confidence and motivation. However, when an individual lacks motivation, they acquire minimal knowledge through struggle because they do not perceive any value in learning (Borah, 2021).

However, contrasting findings suggest that the motivational impact of vodcasts and PowerPoint presentations is often inconsistent and dependent on its implementation. While vodcasts are generally engaging, Noetel et al. (2022) indicate that poorly structured or overly lengthy videos may lead to cognitive overload, reduced attention, and passive viewing behavior, which can limit learners' motivation and engagement. In some cases as mentioned by Desai and Kulkarni (2022), learners may become distracted or fail to actively process the content when videos lack interactivity or clear instructional guidance. In the same manner, PowerPoint presentations may possess passive or text-heavy presentations reducing attention and leading to disengagement. Furthermore, Das et al. (2025) found that the inclusion of irrelevant graphics and excessive text in PowerPoint can negatively affect learners' motivation and retention, as these elements may distract rather than support learning. Meanwhile, Barrett et al. (2024) argued that PowerPoint does not inherently enhance motivation or learning outcomes compared to traditional teaching methods, particularly when it promotes passive learning and limits interaction, thereby reducing learners' active engagement in the lesson.

However, it is essential for teachers to thoughtfully integrate multimedia elements to avoid potential distractions that could impede learning. As stressed by Noetel et al. (2022), simply adding multimedia does not guarantee increased motivation; the design and relevance of these materials are critical factors. Poorly designed multimedia resources can lead to cognitive overload, reducing learners' ability to retain and apply information. Therefore, teachers should strive to balance multimedia integration with pedagogical objectives to create engaging and effective learning experiences that genuinely enhance student motivation. When implemented correctly, multimedia-based instruction can support differentiated learning, improving both motivation and academic performance (Castillo & Towler, 2023).

While both vodcast and PowerPoint are recognized as effective multimedia tools, most studies examine them independently or as part of general multimedia instruction rather than directly comparing their effects on specific motivational components. Moreover, limited research integrates these tools within a structured instructional framework such as the ARCS model or the 7Es model. Thus, anchored on the earlier discussion of motivation, the present study addresses this gap by comparing vodcast and PowerPoint within a structured instructional approach, providing clearer evidence on how each modality influences learners' motivation in Biology.

Methodology

Research Design

A quasi-experimental non-equivalence pretest-posttest design was employed in this study because random assignment of learners to experimental conditions was not feasible in the natural school setting, where classes were already pre-organized into intact sections. This approach allowed the researcher to examine causal relationships while maintaining the authenticity of the classroom environment and minimizing disruption to regular instruction. The design was used to examine the effect of vodcast and PowerPoint on the academic performance and motivation of Grade 9 learners in Biology. This involved two intact classes: one group was taught using vodcasts, while the other group was taught using PowerPoint presentations. Both groups received the same instructional content and classroom activities. A pre-test was administered prior to the intervention, and a post-test was conducted after the implementation of the developed lessons to measure differences in learners' academic performance. To evaluate the learners' motivation in Biology, the Science Motivational Scale instrument, which was adapted from Keller and Suzuki (2021) was used. This instrument was administered to both groups before and after the study to determine any changes in learners' motivation levels resulting from the instructional methods used.

Research Locale

The study was carried out at Balubal National High School (BNHS), the only public high school in Barangay Balubal, Cagayan de Oro City, Misamis Oriental. The school serves approximately 700 learners across four sections in Grades 7 to 10. Additionally, BNHS offers senior high school programs under the Technical-Vocational-Livelihood (TVL) and General Academic Strand (GAS), with two sections per grade level in both Grade 11 and 12. Both junior and senior high school learners were randomly assigned to their respective sections, resulting in heterogeneously grouped classes. The school is staffed by 28 teachers, including two (2) Science Teacher I and two (2) Science Teacher III, who contribute to delivering quality science education. With its diverse learner population and dedicated teaching staff, BNHS provides a dynamic learning environment that supports the integration of multimedia-based instructional strategies in science education.

The school is equipped with eighteen (18) functional computer facilities and a stable internet connection, providing essential support for both teaching and learning. These computer laboratories are actively utilized in science instruction, particularly for multimedia-based lessons, simulations, video presentations, and research activities aligned with the curriculum. Learners are regularly exposed to these facilities as part of their curriculum which help develop their digital literacy, technical proficiency, and research skills. They also utilize these resources for academic projects, presentations, and collaborative learning, preparing them for the demands of a technology-driven world.

In addition to its technological resources, BNHS actively promotes scientific literacy and environmental awareness through its annual Science Month Celebration. This event includes a series of activities that engage learners from all grade levels, such as the Science Quiz Bee, Poster and Slogan Making Contests, Science Fairs and Symposiums, as well as community-centered initiatives like Clean-Up Drives and Tree Planting Activities. Learner participation in these activities is generally high, with learners demonstrating active engagement, collaboration, and enthusiasm. Their involvement reflects not only compliance with school requirements but also genuine interest in science-related tasks, as evidenced by their participation in competitions, presentations, and hands-on environmental initiatives.

On the other hand, teachers undergo regular training to maximize the effective use of technological facilities in their instruction. Professional development programs include workshops on integrating instructional software, utilizing digital tools for interactive learning, and adopting innovative teaching strategies that incorporate technology. These training sessions ensure that teachers stay updated with the latest advancements in educational technology, enabling them to create engaging and learner-centered learning experiences. Through this continuous professional development, teachers are better prepared to support learners in developing critical thinking, problem-solving, and digital literacy skills which are the key competencies for academic success.

Participants of the Study

The participants of this study consisted of eighty (80) Grade 9 learners who were officially enrolled for the School Year 2025-2026, drawn from two intact classes composed of 40 learners each. These classes were assigned as the groups exposed to vodcast and PowerPoint, ensuring that both groups received instruction within their natural classroom settings. The participants were heterogeneously grouped, representing a diverse range of academic abilities. To maintain the authenticity of classroom dynamics and minimize potential biases, the researcher selected two separate intact sections rather than reassigning learners or creating artificial groupings. This approach preserved the natural learning environment and reduced external disruptions that influenced the study's outcomes. The researcher employed complete enumeration in selecting participants, ensuring that all learners within the chosen sections were included in the study.

Learners from other Grade 9 sections, as well as those from other grade levels (Grades 7, 8, and 10), were excluded from the study. This was to ensure curricular alignment, as the lessons used were specific to the Grade 9 Biology curriculum. Furthermore, learners who were frequently absent, did not complete all required assessments, or failed to submit the necessary assent and informed consent forms were also excluded from the final data set. Including other grade levels were introduce variations in subject content and developmental readiness, which can compromise the validity of the findings. Moreover, limiting the participants to two intact sections helped control for external variables such as differences in teaching style, time allotment, and access to learning resources. This decision reflected logistical considerations, as the selected sections shared a consistent schedule and instructional setting conducive to the implementation of vodcast and PowerPoint.

Design and Development of the Lessons using Vodcast and PowerPoint Instructions

Following the K-12 Curriculum Guide, the researcher developed a Task Analysis Matrix (TAM) that outlined the lessons, learning objectives, key concepts and skills, vodcast and PowerPoint instructions, time frame, and references. The topics for the lessons, namely, Respiratory System, Circulatory System, and the Effects of Lifestyle on the Functions of the Respiratory and Circulatory Systems, were carefully selected based on the Most Essential Learning Competencies (MELCs) for the first quarter. These topics were chosen after conducting a needs assessment based on the last five years of classroom data, which indicated that these areas as critical to learners' understanding in Grade 9 Biology. The lessons were arranged sequentially to ensure a logical progression and continuity of concepts. Various instructional resources, including Biology textbooks, Learners' Manuals, Self-Learning Modules, and credible online materials, were incorporated to support the vodcast and PowerPoint instructions. The initial version of the

TAM undergone a comprehensive review by the researcher's adviser and colleagues in the field of Science teaching to ensure its accuracy and instructional validity before final refinement and implementation.

Furthermore, during the Explain phase, vodcast provided clear, visual, and auditory explanations of concepts, allowing learners to revisit content as needed, while PowerPoint relied on direct teacher explanation and text-based slides. The Elaborate phase in vodcast instruction included additional scenarios and real-world applications through video case studies, whereas PowerPoint focused on teacher-facilitated discussions. In the Evaluate phase, vodcast included embedded quizzes or reflection prompts, while PowerPoint incorporated teacher-led assessments and learner responses. Finally, in the Extend phase, vodcast encouraged learners to engage in independent or group video challenges to apply their knowledge, while PowerPoint prompted learners to create presentations or written reports with real-world application of their learning.

Vodcast and PowerPoint instructions were developed and used to determine their effects on the academic performance and motivation of Grade 9 learners in Biology. One group of learners was exposed to a researcher-developed vodcast created through Canva. This vodcast included elements such as narration, animated visuals, on-screen text, background audio, and embedded questions to reinforce learner engagement. This was made for both online and offline accessibility, allowing learners to engage with the content through personal devices, USB drives, or school-owned computers. To ensure inclusivity and fairness, learners without access to personal gadgets were scheduled to use computer laboratories or provided with classroom viewing opportunities.

Meanwhile, another group of learners was taught using PowerPoint instruction, which featured structured slides containing concise textual explanations, labeled diagrams, relevant images, and subtle animations designed to enhance visual understanding. These slides were sequenced logically to support teacher-led discussions and served as visual aids to clarify scientific concepts, particularly on the topics of the respiratory system, circulatory system, and the effects of lifestyle on these systems. Both multimedia-based instructions were aligned to the 7Es instructional format to support active learning.

Validation and Revision of the Developed Lessons

The vodcast and PowerPoint were validated by experts with diverse and relevant qualifications for corrections and suggestions. The validators included experts from the State University and High School, bringing extensive expertise in instructional material development, educational research, pedagogy, and curriculum implementation. Their collective expertise ensured the validity, reliability, and alignment of the research instruments with the study's objectives. The evaluators were provided with an evaluation checklist and set of criteria established by the evaluating committee of Bukidnon State University to examine the materials' content, content accuracy, clarity, and appropriateness. The respective panel of experts assessed the developed lessons whether the features cited in the criteria are being taken into consideration.

For the vodcast instruction, the evaluation focused on: content and narration quality, technical and visual quality, clarity and appropriateness, and interactivity and engagement. The panel of experts assessed whether each material effectively supports the intended learning outcomes and meets the expected standards of multimedia instruction. For the PowerPoint instruction, the criteria included: content accuracy, visual and slide design, clarity and appropriateness, and instructional quality ensuring its alignment with the K to 12 Most Essential Learning Competencies (MELCs). Based on their recommendations, necessary revisions were made before implementing the finalized instructional materials in the classroom.

Research Instrument

Two instruments were used in this study to assess learners' academic performance and motivation. The first instrument was a 60-item multiple-choice researcher-made test covering three lessons from Grade 9 Biology. This test was designed to evaluate learners' academic performance and reviewed by experts to ensure its alignment with the learning objectives. To establish its reliability, a pilot test was conducted, followed by item analysis to refine and enhance the test items. The second instrument was a motivation questionnaire adapted from Keller and Suzuki (2021) to suit the context of the study. The adaptation involved minor modifications in the wording of selected items to ensure clarity, contextual relevance, and appropriateness for Grade 9 Biology learners, while retaining the original structure and core constructs of the instrument. The questionnaire measured learners' motivation levels in learning Biology, focusing on key aspects such as attention, relevance, confidence, and satisfaction.

Similar to the first instrument, the questionnaire underwent expert validation and reliability testing prior to its administration. The reliability of the instrument was established using Cronbach's alpha, which yielded the following coefficients: attention ($\alpha = 0.715$), relevance ($\alpha = 0.743$), confidence ($\alpha = 0.841$), and satisfaction ($\alpha = 0.741$). These values indicate high to very high internal consistency, confirming that the instrument is reliable and appropriate for measuring learners' motivation. Furthermore, each item demonstrated a Corrected Item-Total Correlation coefficient of greater than 0.30, indicating that all items were valid, consistent, and acceptable measures of the intended constructs.

The Academic Performance Test

This study employed a researcher-made test aligned with the K-12 curriculum guide. This test was administered to all participants prior to the instructional intervention to determine their baseline understanding. After the implementation of the multimedia-based lessons, the same test was administered as a post-test to measure any improvements in academic performance. The test was designed using a Table of Specifications (TOS) which was developed prior to test construction. The TOS outlined the cognitive process dimensions, including remembering, understanding, applying, analyzing, evaluating, and creating, along with the corresponding number of items for each category. To ensure the reliability of the test materials, a pilot test was conducted at BNHS with forty (40) Grade 10 learners, allowing for necessary refinements before administration.

Academic Performance Test Scoring Procedure. The researcher utilized a researcher-made academic performance test with a total of 60 items. The scoring procedure for this study followed the DepEd Order No. 8, s. 2015 and the qualifying statement was adapted from DepEd Order No. 73, series of 2012. From the pre-test and post-test, each result was categorized into its specific performance level: *Outstanding*, *Very Satisfactory*, *Satisfactory*, *Fairly Satisfactory* and *Did Not Meet Expectations*. The scoring descriptions were as follows:

Grading Scale	Score Range	Performance Level	Qualifying Statement
90- 100%	54-60	Outstanding	Exceeds the core requirements in terms of knowledge, skills and understanding and can transfer them automatically and flexibly through an authentic task.
85-89%	51-53	Very Satisfactory	Develop the fundamental knowledge, skills and understanding and can transfer them automatically and flexibly through an authentic task.
80-84%	48-50	Satisfactory	Develop the fundamental knowledge, skills and understanding with little guidance from the teacher and can transfer these understandings through an authentic task.
75-79%	45-47	Fairly Satisfactory	Possess the minimum knowledge, skills and core understanding but needs help throughout the authentic task.
Below 75%	0-44	Did not meet expectations	Struggles with understanding the prerequisite and fundamental knowledge and skills.

Source: DepEd Order No. 8, s. 2015 & DepEd Order No. 73, s. 2012

Science Motivation Questionnaire

Both groups were given a motivation questionnaire adapted from Keller and Suzuki (2021), which was modified by the current researcher to align with the objectives of the study. This questionnaire was used to assess learners' motivation levels before and after the implementation of vodcast and PowerPoint instructions. It consisted of 20 items, with five (5) items assigned to each dimension of motivation. The questionnaire followed a 5-point Likert scale with the responses: 1- never; 2- rarely; 3- sometimes; 4- often; 5- always.

Motivational Scale Scoring Procedure. To gain deeper understanding on learners' motivation, a Science Motivation Questionnaire was utilized. All responses remained entirely anonymous to ensure the participants' privacy. Additionally, the study used a descriptive rating interpretation to categorize learners' motivation levels in Biology. Learners responded to the motivation scale based on the provided statements, following the designated scoring rubrics:

Scale	Range	Descriptive Rating	Qualitative Description	Qualifying Statement
5	4.21-5.00	Always	Very Highly Motivated	Very Highly motivated toward attention, relevance, confidence and satisfaction.
4	3.41-4.20	Often	Highly Motivated	Highly motivated toward attention, relevance, confidence and satisfaction.
3	2.61-3.40	Sometimes	Moderately Motivated	Moderately motivated toward attention, relevance, confidence and satisfaction.
2	1.81-2.60	Rarely	Low Motivated	Slightly motivated toward attention, relevance, confidence and satisfaction.
1	1.00-1.80	Never	Very Low Motivated	Not motivated toward attention, relevance, confidence and satisfaction.

To test the validity and reliability of the questionnaire, a tryout was conducted to forty (40) Grade 10 learners of BNHS with the assistance of their Science teacher.

Data Gathering Procedure

The researcher ensured that ethical standards were upheld throughout the study by securing all necessary approvals and obtaining an assent form co-signed by both the learner and their parent or guardian. To initiate the process, a formal request for permission was submitted to the Dean of the College of Education and addressed to the Schools Division Superintendent of Cagayan de Oro City. Upon receiving approval, copies of the letter were forwarded to the Public Schools District Supervisor and the School Principal of Balubal National High School for further authorization. Additionally, separate approval letters were obtained to conduct both the pilot test and the actual study. Before data collection, the researcher organized an orientation for the parents of learner-participants, where the purpose, procedures, and ethical considerations of the study were thoroughly discussed. To ensure voluntary participation, informed consent forms were provided, requiring signatures from both parents and learners.

The study followed a systematic implementation process. A pilot test involving forty (40) Grade 10 learners was initially conducted to establish the reliability and validity of the research instruments. Based on the pilot results, refinements were made to ensure accuracy and clarity. The actual implementation of the study took place during the first grading period over four weeks. The process started with a pre-test administered to both groups to assess baseline knowledge and motivation levels. One group received instruction through vodcasts, while the other group was taught using PowerPoint. The vodcast instruction was implemented with teacher facilitation where learners viewed the video-based lessons during scheduled sessions under the guidance of the teacher. The teacher provided context, monitor engagement, and facilitate post-viewing discussions and activities aligned with the 7Es format. This blended approach ensured active learning while maintaining instructional consistency. Both groups covered the same lesson content within the designated timeframe. At the end of the intervention, a post-test was administered to evaluate academic performance, and a motivation questionnaire was given to measure any changes in

learners' motivation. Data collection were carried out systematically, adhering to ethical research protocols and minimizing disruption to the learners' regular academic schedule.

Ethical Considerations

The researcher strictly adhered to ethical standards throughout the study. Prior to the administration of the research instruments, an assent form was distributed and explained to all learner-participants, which was co-signed by both the learners and their parents or legal guardians. This form outlined the study's objectives, procedures, potential risks, and participants' rights, including their voluntary participation, the option to decline involvement in any part of the research, and the freedom to withdraw at any time without academic penalties or impact on their grades. The researcher also established baseline comparability between the two classes by administering a pre-test to verify that their academic performance levels are reasonably similar. While the study is low-risk in nature, the researcher acknowledges that any research involving human participants, particularly minors, must include measures to mitigate possible physical, psychological, social, and economic risks.

Confidentiality and anonymity were strictly maintained at all stages of the study. Codes or pseudonyms were used in place of real names to minimize the risk of identifying learner-participants. Access to research instruments, raw data, and participants' responses were limited to the researcher, the thesis committee members, and the panel of experts involved in the study. To ensure fairness and integrity, no manipulation of scores occurred during or after data collection. All results were recorded as they are obtained. Moreover, all data collected were securely stored and disposed properly through secure deletion of digital files and shredding of physical documents after the conclusion of the research.

Considering that the participants were minors and may be regarded as a vulnerable population, extra care was taken to ensure that their participation did not cause emotional or psychological distress. Proper ethical protocols were observed when working with vulnerable groups, including but not limited to Indigenous Peoples (IP), persons with disabilities (PWDs), and young mothers, should they be represented among the participants. The researcher ensured cultural sensitivity, accessibility, and fairness throughout the conduct of the study to avoid discrimination or unintentional harm. Any participant needing special support was accommodated appropriately and ethically. As a gesture of appreciation and motivation, participants received small incentives such as ballpen and chocolates as token or reward. These were provided in a manner that does not unduly influence participation but acknowledges their contribution to the study.

Although the principal investigator (PI) is the classroom teacher of the participants, all possible measures were taken to manage any potential conflict of interest with integrity and transparency. Learners were not forced, coerced, or unduly influenced to participate in the study. The PI ensured that participation or non-participation did not affect learners' academic standing, class treatment, or grades in any way. Recruitment was conducted with full ethical consideration, and learners were made aware that their decision to join in the study had no consequence on their academic status. The research implemented impartially and without bias to safeguard credibility of the findings. In addition to the protection of participants, the study also upholds ethical responsibilities related to research transparency, collaboration, and dissemination. Furthermore, the study undergone review and received clearance from the Research Ethics Committee to confirm its compliance with established ethical protocols.

Treatment of the Data

The present research utilized statistical techniques such as mean and standard deviation to answer problem numbers 1 and 2. These were the academic performance of the learners who were exposed to vodcast and PowerPoint instructions as well as the motivation in Biology of both groups. Additionally, One-Way Analysis of Covariance (ANCOVA) at 0.05 level of significance was used for problem numbers 3 and 4. This was utilized to test the significant difference in the academic performance and motivation of Grade 9 Biology learners.

Results and Discussion

Academic Performance of Grade 9 Biology Learners

Academic performance refers to the degree to which a learner, teacher, or educational institution achieves specific short-term or long-term learning objectives, typically evaluated through various forms of continuous assessment (Matunga, 2019). It reflects how learners interact with their studies and their ability to complete assigned tasks effectively. It serves as a measure of a learner’s progress, assessing their comprehension and skill development over time (Brew et al., 2021). Additionally, it provides insight into how well learners perform in comparison to their peers within the same academic domain. This acts as an essential indicator of a learner’s success and mastery of subject matter (Khan, 2023). Table 1 presents the distribution of learners’ performance levels in the pre-test and post-test for vodcasts and PowerPoint presentations groups. In the pre-test, the majority of learners in both groups were classified under the *Did Not Meet Expectations* and *Fairly Satisfactory* levels. This indicates that prior to the intervention, learners in both groups demonstrated low levels of mastery of the Biology concepts.

Performance Level	Vodcast		PowerPoint	
	Pre-Test	Post-Test	Pre-Test	Post-Test
Outstanding	0	0	0	0
Very Satisfactory	0	34	0	0
Satisfactory	0	6	0	0
Fairly Satisfactory	15	0	7	40
Did Not Meet Expectations	25	0	33	0
Mean	20.93	45.00	16.88	31.09
Standard Deviation	5.78	8.39	4.81	5.78
Descriptive Level	Did Not Meet Expectations	Very Satisfactory	Did Not Meet Expectations	Fairly Satisfactory

After the implementation of the instructional interventions, a notable shift in performance levels was observed. In the vodcast group, none of the learners remained in the lower performance categories. Instead, learners moved to the *Very Satisfactory* and *Satisfactory* levels. Similarly, in the PowerPoint group, all learners improved to the *Fairly Satisfactory* level. These findings suggest that both instructional approach

contributed to improving learners' academic performance. However, the vodcast group demonstrated a higher level of achievement, as evidenced by the greater number of learners reaching higher performance categories compared to the PowerPoint group.

These trends are further supported by the mean and standard deviation of both groups. Prior to the intervention, both groups were described as *Did Not Meet Expectations*, indicating that learners initially had limited understanding of the Biology concepts. This reflects a relatively similar baseline performance between the groups before the implementation of the instructional strategies. Following exposure to the respective instructional approaches, a marked improvement was observed in both groups. The vodcast group achieved a *Very Satisfactory* level of performance, indicating a substantial improvement in learners' understanding. In contrast, the PowerPoint group also showed progress, reaching the *Fairly Satisfactory* level. The distribution of learners across performance levels further reveals that while most learners initially struggled with the content, there was a clear shift toward higher performance categories after the intervention.

The results suggest that vodcasts were more effective in elevating learners' academic performance in Grade 9 Biology than PowerPoint presentations. This further implies that the use of vodcast may contribute to learners' understanding of the fundamental Biology concepts by presenting content through synchronized visual and auditory elements. While PowerPoint instruction contributed to performance gains, the concentration of learners who continued to fall below the expected proficiency level indicates that it may offer more limited support for mastering complex biological concepts. These results denote that the multimodal nature of vodcasts may better support comprehension and retention by engaging multiple sensory channels.

Significantly, the effectiveness of vodcasts can be clearly explained when viewed within the context of the 7Es instructional model utilized in the study. During the Engage phase, vodcasts captured learners attention through visually stimulating and context-based introductions. In the Explore phase, learners interacted with the video content that presented guided inquiry. Furthermore, the Explain phase, which relied heavily on vodcasting, enabled learners to receive clear, structured, and repeatable explanations of concepts to enhance their comprehension on the lesson. In the Elaborate stage, vodcasts provided extended examples and applications that allowed learners to deepen their understanding

The observed advantage of vodcast instruction aligns with the Cognitive Theory of Multimedia Learning (Mayer, 2021), which suggests that integrating visual and auditory channels facilitates more meaningful learning by promoting active processing and reducing cognitive overload. Reinforcing this theoretical foundation, Kassa et al. (2024) consistently emphasized that video-based instruction leads to higher academic performance compared to static presentation formats, especially in complex subjects such as science. This suggests that when applied in the Explore phase, vodcasts can actively engage learners in discovering concepts compared to traditional PowerPoint presentations, which are often linear and text-based.

In addition, Taoc and Ramirez (2025) highlighted that learners' academic performance attained a very satisfactory level after they were exposed to video-based compared to those group who used PowerPoint instructions, implying that video-based instruction has potentially increased learners' academic performance. This outcome may be attributed to the effectiveness of vodcasts in both Explore and Explain stages of the lesson, where learners are not only introduced to concepts through engaging media but also guided through clearer understanding of the lesson. Moreover, Manginyog and Ambayon (2024) cited the positive impact of video materials on learners' achievements in literature classes. The study found that

incorporating podcasts into the curriculum significantly enhanced learners' learning outcomes. Dahlan et al. (2023) also mentioned that vodcasts allow learners to control pacing, revisit explanations for better mastery, and visualize abstract biological processes, which enhances comprehension and long-term retention.

In contrast, while PowerPoint presentations can support learning when well-designed, they may be less effective when they rely heavily on text and linear delivery, potentially limiting deeper engagement and understanding (Akgün et al., 2021). Supporting this, Petrusse et al. (2024) found that excessive text and irrelevant visuals in PowerPoint presentations may hinder retention and reduce learning effectiveness. Moreover, LeFebvre et al. (2022) reported that when PowerPoint is used as a predominantly text-driven and teacher-centered tool, it may constrain learner engagement and higher-order thinking. Similarly, Ho and Mun (2026) argued that PowerPoint does not inherently improve academic performance and may even promote passive learning when not used interactively. Reddi et al. (2025) further emphasized that while PowerPoint can organize content effectively, its impact on learning depends largely on how it is designed and delivered.

Motivation of Grade 9 Biology Learners

The data on learners' motivation in Biology was also treated and analyzed using the mean and standard deviation. The researcher used a modified motivation questionnaire from Keller and Suzuki (2021) to assess the learners' motivation in terms of the *Attention, Relevance, Confidence* and *Satisfaction*.

Overall Learners' Motivation Before and After the Implementation

Table 2 presents the overall motivation levels of Grade 9 Biology learners when taught using vodcasts and PowerPoint presentations across the four domains of Keller's ARCS model: attention, relevance, confidence, and satisfaction. The table summarizes the pre-test and post-test mean scores, standard deviations, and qualitative descriptions, thereby providing a consolidated view of learners' motivational dispositions before and after the instructional intervention. Motivation is conceptualized as a multidimensional construct reflecting learners' engagement, perceived value of learning tasks, belief in their capability to succeed, and emotional response to instructional experiences (Fuertes et al., 2023).

Table 2. Motivation Levels of Grade 9 Biology Learners

Motivation	Vodcast						PowerPoint					
	Pretest			Posttest			Pretest			Posttest		
	Mean	SD	QD	Mean	SD	QD	Mean	SD	QD	Mean	SD	QD
Attention	3.25	0.96	MM	3.89	0.87	HM	3.11	0.83	MM	4.00	0.68	HM
Relevance	3.31	1.10	MM	4.23	0.81	VHM	3.19	1.06	MM	4.21	0.87	VHM
Confidence	3.27	1.18	MM	4.36	0.79	VHM	3.19	1.72	MM	4.35	1.47	VHM
Satisfaction	3.20	1.01	MM	4.25	0.75	VHM	3.25	2.39	MM	4.39	2.20	VHM

Legend: VHM- Very Highly Motivated, HM- Highly Motivated, MM- Moderately Motivated, LM- Low Motivated, VLM- Very Low Motivated

As shown in the table, both groups exhibited moderate levels of motivation across the four domains during the pre-test, indicating that learners initially engaged with Biology lessons only intermittently. Following the intervention, the post-test results reveal substantial increase in motivation across all domains for both groups. These results indicate that multimedia-based instruction, including vodcasts and PowerPoint presentations, can improve learners' motivation in Biology. The marked improvement in attention

suggests that dynamic audio-visual presentations captured learners' interest more effectively than static materials alone.

Increases in relevance indicate that learners perceived stronger connections between the lesson content and their future goals. Similarly, enhanced confidence reflects a growing belief in their ability to understand and perform academic tasks, while higher satisfaction levels suggest positive emotional responses and a sense of accomplishment after engaging with the lessons. These outcomes point imply that learners became more psychologically invested in the learning process when exposed to vodcasts and PowerPoint presentations.

The results are consistent with Keller's ARCS model, which posits that motivation is sustained when instruction simultaneously captures attention, establishes relevance, builds confidence, and produces satisfaction (Keller & Suzuki, 2021). Multimedia instructions, particularly video-based formats and PowerPoint presentation, have been widely recognized as an effective strategy for enhancing learners' attention and engagement. This claim was supported by Wong and Adesope (2021) who highlighted that multimedia environments incorporating novelty, multimodal stimulation, and narrative structures effectively sustain learners' attention and minimize disengagement, particularly in complex subjects.

Furthermore, the importance of contextualizing instructional materials was emphasized in the study of Molina and Ramirez (2025), who reported that when learning content is connected to learners' real-life experiences, perceived relevance increases, leading to stronger persistence and more goal-oriented learning behaviors. Consistent with this perspective, Chiu (2022) noted that technology-supported instruction can strengthen learners' sense of autonomy and competence, thereby enhancing motivational outcomes. Learners' satisfaction with the learning process has also been associated with positive feedback and successful task completion. This relationship was discussed by Castillo and Towler (2023), who indicated that when learners receive constructive feedback and experience achievement, their engagement and motivation tend to increase. Additionally, the effectiveness of multimedia instruction in supporting diverse learning needs was demonstrated in the study of Dahlan et al. (2023), who found that multimedia-based instructional materials facilitate deeper processing of information and accommodate varied learning preferences. A similar observation was presented in the study of Noetel et al. (2022). who reported that well-designed multimedia learning environments enhance both learner motivation and academic outcomes.

However, despite the observed increase in learners' motivation, the corresponding academic performance did not reach an equally high level, particularly in comparison to motivation outcomes. This suggests that while multimedia instruction effectively enhances attention, relevance, confidence, and satisfaction, these motivational gains do not automatically translate into high academic achievement. One possible explanation is that learners may have been highly engaged and interested during instruction, but still required more time, practice, and scaffolding to fully master complex Biology concepts. This aligns with the idea that motivation is a driving force for learning, but not a sole determinant of immediate performance outcomes. Additionally, differences in cognitive processing, prior knowledge, and learning pace may have influenced how motivation was translated into actual academic performance. These findings imply that while vodcast and PowerPoint significantly enhance learners' motivation, additional instructional support is still necessary to fully maximize their academic achievement.

Attention Table 3 shows the learners' motivation in terms of attention before and after the implementation of multimedia-based instruction using vodcasts and PowerPoint presentations. The results indicate a noticeable improvement in learners' attention after the intervention.

Table 3. Learners’ Motivation in terms of Attention Before and After the Implementation of Multimedia-Based Instruction

Variables	Vodcast						PowerPoint					
	Pre-Test			Post-Test			Pre-Test			Post-Test		
	Mean	SD	QD	Mean	SD	QD	Mean	SD	QD	Mean	SD	QD
The learning materials stimulated my curiosity about the topic.	3.55	1.01	HM	4.18	0.93	VHM	3.30	1.02	MM	4.15	0.69	HM
The use of multimedia made the lesson more interesting.	3.40	0.93	MM	4.00	0.72	HM	3.23	0.76	MM	4.15	0.54	HM
The lesson captured my interest from the beginning.	3.30	0.76	MM	3.83	0.75	HM	2.03	0.71	MM	4.03	0.67	HM
The learning activities were engaging and prevented me from feeling bored.	3.30	0.88	MM	3.75	1.06	HM	3.03	0.65	MM	3.90	0.77	HM
The teacher’s strategies helped maintain my focus throughout the lesson.	2.68	1.23	MM	3.70	0.88	HM	2.95	1.04	MM	3.78	0.71	HM
Mean	3.25	0.96	MM	3.89	0.87	HM	3.11	0.83	MM	4.00	0.68	HM

Legend: VHM- Very Highly Motivated, HM- Highly Motivated, MM- Moderately Motivated, LM- Low Motivated, VLM- Very Low Motivated

Before the implementation, the vodcast group obtained a Moderately Motivated level while after the implementation it reached to Highly Motivated. This indicates that the use of vodcast an instructional material increased learners’ curiosity, interest, and engagement during the lesson. The statement “*The learning materials stimulated my curiosity about the topic.*” improved from Highly Motivated to Very Highly Motivated. These findings suggest that vodcast-based instruction effectively captures learners’ attention and enhances their motivation to learn.

On the other hand, the PowerPoint group also showed improvement in learners’ motivation. The overall pre-test level was interpreted as Moderately Motivated, while the post-test result increased to Highly Motivated. Notably, the item “*The lesson captured my interest from the beginning.*” showed a substantial improvement from a moderate to a high level of motivation. Similarly, the statement “*The learning activities were engaging and prevented me from feeling bored.*” also improved from a moderate to a high level of motivation. These results indicate that PowerPoint presentations also play a significant role in improving learners’ attention and engagement during the learning process. The findings suggest that both instructional approaches were effective in enhancing learners’ motivation; however, vodcast demonstrated a relatively stronger impact in sustaining higher levels of curiosity and engagement.

The improvement in learners’ attention can be explained through Keller’s ARCS Model, which highlights attention as a key component in motivating learners. As stated by Keller (2010), instructional strategies that incorporate stimulating and varied learning experiences help capture and sustain learners’ interest. In this study, the integration of multimedia elements such as vodcasts and PowerPoint presentations likely provided visual and auditory stimulation which enhanced learners’ focus and curiosity. This further implies that the increase in learners’ attention can be attributed to the interactive components embedded within the instructional activities. In particular, the *Mix and Match Activity* during the Explore phase encouraged active participation as learners were required to analyze and connect related concepts. Likewise, the *Oxygen Treasure Map* in the Elaborate stage provided a gamified learning experience that sustained learners’ interest while navigating the task.

Similarly, Wong and Adesope (2021) found that multimedia lessons containing emotionally appealing and interactive elements significantly increase learners’ attention and motivation. The results further align with the study of Lange and Costley (2020), which emphasized that video-based instruction can present real-life contexts that capture learners’ interest and encourage active participation in the learning process. Furthermore, Howard et al. (2021) suggested that instructional materials which are engaging and relevant to learners’ experiences contribute to higher levels of participation and sustained attention. In the context of this study, multimedia-based instruction may have helped learners better visualize concepts and connect them to meaningful learning experiences, thereby maintaining their focus throughout the lesson.

Relevance

The relevance mean scores and standard deviation for both groups' pre- and post-test results are shown in Table 4. The data show a clear increase in the mean scores from the pre-test to the post-test for both instructional media, indicating that multimedia-based instruction positively influenced learners’ perception of the relevance of the lesson.

Table 4. Learners’ Motivation in terms of Relevance Before and After the Implementation of Multimedia-Based Instruction				
Variables	Vodcast		PowerPoint	
	Pre-Test	Post-Test	Pre-Test	Post-Test

	Mean	SD	QD	Mean	SD	QD	Mean	SD	QD	Mean	SD	QD
I found the topic useful for my daily life or future goals.	3.68	1.07	HM	4.35	0.74	VHM	3.33	1.31	MM	4.33	0.98	VHM
The learning activities were appropriate to my level and learning needs.	3.45	1.22	MM	4.35	0.77	VHM	3.28	1.20	MM	4.30	1.07	VHM
The lesson made me realize the value of what I am learning.	3.35	1.19	MM	4.25	0.78	VHM	3.25	0.96	MM	4.15	0.79	HM
The lesson content was related to real-life situations that I can understand.	3.13	0.99	MM	4.15	0.86	HM	3.08	0.98	MM	4.15	0.89	HM
The examples used in the lesson helped me see the importance of the topic.	2.95	1.01	HM	4.05	0.90	HM	3.03	0.83	MM	4.13	0.63	HM
Mean	3.31	1.10	MM	4.23	0.81	VHM	3.19	1.06	MM	4.21	0.87	VHM

Legend: VHM- Very Highly Motivated, HM- Highly Motivated, MM- Moderately Motivated, LM- Low Motivated, VLM- Very Low Motivated

For the vodcast group, the overall mean score was interpreted as Moderately Motivated during the pre-test to Very Highly Motivated in the post-test. This improvement suggests that learners perceived the

lesson as more relevant to their personal goals and daily lives after experiencing the vodcast instruction. Correspondingly, the PowerPoint group showed a notable increase from Moderately Motivated in the pre-test to Very Highly Motivated in the post-test. These results indicate that both multimedia tools enhanced learners’ motivation by helping them understand the connection between lesson content and real-life applications. The results further imply that multimedia presentations made the lesson more meaningful and engaging for learners.

Looking at the individual indicators, all items showed improvement after the intervention. For instance, the statement “*I found the topic useful for my daily life or future goals*” and “*The learning activities were appropriate to my level and learning needs*” increased in both vodcasts and PowerPoint presentations. These increases indicate that multimedia-based instruction helped learners recognize the importance of the lessons. These improvements might stem from the specific features of both vodcasts and PowerPoint presentations that enhanced learners’ sense of relevance. In the vodcast group, the integration of contextualized examples, guided narration, and visual animations allowed learners to see how scientific concepts are applied in everyday situations. Meanwhile, in the PowerPoint presentations group, the structured presentation of content through simplified bullet points, illustrative images, and teacher-guided explanations helped align the lessons with learners’ cognitive level and prior knowledge, making the activities more appropriate and easier to understand. These features bridged classroom learning with real-world applications, boosting learner engagement and interest.

The findings support the ARCS Motivation Model, particularly the relevance component, which emphasizes the importance of connecting learning content to learners’ needs, experiences, and future goals. According to Chiu (2021), when learners perceive that learning materials are related to their real-life experiences and personal goals, their motivation and engagement in learning significantly increase. Furthermore, the study of Marrie (2023) revealed that the integration of multimedia technologies in instruction can improve learners’ motivation because it presents information through engaging visuals, audio, and interactive elements that make learning more meaningful and understandable. This explains why the learners’ motivation increased significantly after the use of vodcasts and PowerPoint presentations. These features made abstract ideas more concrete and personally meaningful.

Confidence

Learners’ motivation in terms of confidence before and after the implementation of multimedia-based instruction using vodcast and PowerPoint is shown in Table 5. The results show a noticeable improvement in learners’ confidence levels after the use of multimedia-based instructional materials. For both instruction, vodcasts and PowerPoint presentations, the overall mean increased from Moderately Motivated in the pre-test to Very Highly Motivated in the post-test. These results indicate that both multimedia strategies effectively enhanced learners’ confidence in understanding and performing the tasks related to the lesson.

Variables	Vodcast						PowerPoint					
	Pre-Test			Post-Test			Pre-Test			Post-Test		
	Mean	SD	QD	Mean	SD	QD	Mean	SD	QD	Mean	SD	QD
The learning materials	3.45	1.11	HM	4.48	1.72	VHM	3.95	1.86	HM	4.48	1.72	VHM

helped me believe that I can perform well in the subject.												
I felt capable of completing the tasks given in the lesson.	3.43	1.43	HM	4.35	1.23	VHM	3.23	1.72	MM	4.35	1.23	VHM
The lesson helped me feel confident that I can understand the topic.	3.30	0.97	MM	4.35	1.31	VHM	3.18	1.98	MM	4.35	1.31	VHM
The instructions and explanations were clear and easy to follow.	3.15	1.08	MM	4.33	1.60	VHM	2.80	1.40	MM	4.33	1.60	VHM
The activities allowed me to succeed through my own effort.	3.00	1.32	MM	4.23	1.48	VHM	2.78	1.63	MM	4.23	1.48	VHM
Mean	3.27	1.18	MM	4.35	1.47	VHM	3.19	1.72	MM	4.35	1.47	VHM

Legend: VHM- Very Highly Motivated, HM- Highly Motivated, MM- Moderately Motivated, LM- Low Motivated, VLM- Very Low Motivated

A closer examination of the indicators further supports this finding. For instance, the statement “*The learning materials helped me believe that I can perform well in the subject*” and “*I felt capable of completing the tasks given in the lesson*” increased to Very Highly Motivated level in the post-test for both groups. Other indicators such as understanding the topic, clarity of instructions, and the ability to succeed through one’s own effort also showed similar improvements. These results suggest that multimedia-based instruction strengthened learners’ self-efficacy and confidence in their ability to complete learning tasks successfully.

The findings support the confidence component of Keller’s ARCS Motivation Model, which emphasizes that learners become more motivated when they believe they can completely accomplish the learning tasks. This can be linked to the specific activities implemented during the Elicit and Engage phases of the lesson. In the vodcast group, the *Four Pics, One Word* activity presented learners with visual puzzles that encouraged problem-solving and analytical thinking, allowing them to experience small successes that built their confidence in handling the lesson. In a similar manner, the *Bunch of Grapes Model* activity conducted by the PowerPoint group which involved a step-by-step guidance with clear diagrams and interactive explanations, enable them to grasp complex concepts progressively and feel capable of completing the tasks at their own pace.

Correspondingly, the study of Keller and Suzuki (2021) revealed that instructional strategies that provide clear structure, guidance, and supportive learning materials enhance learners’ confidence and encourage persistence in learning activities. This was supported by Chiu (2022) who stated that multimedia-based instruction can contribute to this by presenting information through multiple channels such as visuals, narration, and demonstrations, which can improve learners’ comprehension and reduce learning difficulties. When learners clearly understand the lesson and instructions, they are more likely to feel confident about completing academic tasks.

Additionally, Mayer (2021) emphasized that multimedia instruction improves learners’ understanding because it combines verbal and visual information, enabling learners to process and retain knowledge more effectively. This further coincides with the study of Borah (2021) who found that the integration of digital learning materials enhances learners’ confidence and engagement because they can interact with the content in ways that support their learning pace and comprehension. These findings solidify why learners in both groups demonstrated higher confidence levels after the implementation of vodcasts and PowerPoint presentations.

Satisfaction

Table 6 presents the learners’ motivation in terms of satisfaction before and after the implementation of vodcasts and PowerPoint presentations. The results show a clear improvement in learners’ satisfaction levels after the intervention. For the vodcast group, the overall mean score increased from Moderately Motivated during the pre-test to Very Highly Motivated in the post-test. Likewise, the PowerPoint group improved from Moderately Motivated in the pre-test to Very Highly Motivated in the post-test. These results indicate that the use of multimedia-based instructional materials significantly enhanced learners’ satisfaction with the learning process.

Table 6. Learners’ Motivation in terms of Satisfaction Before and After the Implementation of Multimedia-Based Instruction												
Variables	Vodcast						PowerPoint					
	Pre-Test			Post-Test			Pre-Test			Post-Test		
	Mean	SD	QD	Mean	SD	QD	Mean	SD	QD	Mean	SD	QD
I enjoyed the learning process in this lesson.	3.43	1.03	HM	4.53	0.68	VHM	3.45	2.51	HM	4.48	2.48	VHM

I felt satisfied after completing the learning activities.	3.38	0.90	MM	4.48	0.75	VHM	3.28	2.71	MM	4.45	2.03	VHM
The lesson experience made me want to learn more about the topic.	3.30	1.14	MM	4.15	0.80	HM	3.18	2.37	MM	4.35	2.35	VHM
The feedback I received made me feel good about my performance.	3.00	1.04	MM	4.08	0.76	HM	3.18	2.10	MM	4.33	2.21	VHM
I felt a sense of achievement after the lesson.	2.88	0.97	MM	4.03	0.73	HM	3.15	2.27	MM	4.33	1.92	VHM
Mean	3.20	1.01	MM	4.25	0.75	VHM	3.25	2.39	MM	4.39	2.20	VHM

Legend: VHM- Very Highly Motivated, HM- Highly Motivated, MM- Moderately Motivated, LM- Low Motivated, VLM- Very Low Motivated

An examination of the individual indicators further highlights this improvement. For instance, the statement “*I enjoyed the learning process in this lesson*” and “*I felt satisfied after completing the learning activities*” increased to Very Highly Motivated level in the post-test for both vodcasts and PowerPoint presentations. Other indicators, such as the lesson encouraging learners to learn more about the topic, receiving positive feedback, and experiencing a sense of achievement after the lesson, also showed noticeable increases. The findings indicate that learners experienced heightened enjoyment, fulfillment, and a pronounced sense of accomplishment following their engagement with the multimedia-based instruction. This suggests that learners are most motivated when they perceive the learning process as both intrinsically rewarding and extrinsically reinforced through meaningful educational experiences. The vodcasts were instrumental in fostering intrinsic satisfaction by offering an interactive and emotionally engaging learning environment.

Each vodcast was strategically aligned with the weekly lesson activities outlined in the instructional matrix such as “Bunch of Grapes Model,” “Blood Transportation,” and “Lifestyle Impacts” and employed

animated visuals, teacher narratives, and real-life demonstrations to meaningfully connect scientific content with real-world contexts. This blend of animation and storytelling enabled learners to conceptualize abstract biological processes, such as respiration and circulation, in tangible and relatable ways.

Within the vodcasts, the implementation of instructional models particularly the Elicit, Engage, Explore, Explain and Elaborate phases helped sustain learners' attention as they interacted with visual models and digital simulations. The flexible format, which allowed pausing, replaying, and reflection, supported learner autonomy and self-paced engagement, deepening conceptual understanding and reinforcing a sense of mastery. This approach aligns with Mayer's (2021) Cognitive Theory of Multimedia Learning, which posits that well-designed multimedia instruction enhances comprehension and motivation by effectively integrating visual and auditory channels while minimizing cognitive load. Furthermore, the emotionally appealing and narrative-driven aspects of the vodcasts, as discussed by Wong and Adesope (2021), stimulated emotional engagement and fostered positive attitudes toward learning.

On the other hand, PowerPoint presentations played a vital role in enhancing learner satisfaction by structuring lessons that integrated visual organization, guided interaction, and opportunities for immediate feedback. Implemented across the Elicit, Engage, Explore, Explain, and Elaborate phases of the instructional model, the PowerPoint slides were thoughtfully designed with images, labeled diagrams, and concise summaries of key concepts, serving as reference points throughout each lesson. These design features enabled learners to follow a coherent instructional flow, visualize fundamental biological concepts, and assess their understanding through interactive activities.

Notably, tasks such as "The Oxygen Treasure Map," "Bunch of Grapes Model," and "Information Dissemination" promoted active participation, teamwork, and reflective discussion, transforming lessons into dynamic, student-centered experiences. Through these activities, learners developed a sense of accomplishment as they translated theoretical knowledge into practical and meaningful applications. This outcome aligns with Keller and Suzuki's (2021) model, which posits that satisfaction arises from opportunities to experience both rewards and visible mastery of learning outcomes.

Furthermore, the PowerPoint presentations sustained learner engagement by establishing a visually coherent and learner-centered environment. The integration of visuals and textual cues guided observation, dialogue, and critical thinking, enabling students to draw connections between scientific processes such as gas exchange and blood circulation and real-life contexts emphasized in activities like the *7-Day Healthy Lifestyle Planner*. This alignment between academic content and everyday experience reinforced personal relevance, a key determinant of learner satisfaction as highlighted by Howard et al. (2021).

The findings support the satisfaction component of Keller's ARCS Motivation Model, which emphasizes that learners feel more motivated when they experience positive outcomes and a sense of accomplishment from their learning activities. Satisfaction is achieved when learners perceive that their efforts lead to meaningful results and when they receive appropriate feedback and reinforcement (Keller & Suzuki, 2021). In the vodcast group, this can be attributed to the pure video-based explanation during the Explain phase, where narration, animations, and visual demonstrations presented the content in an appealing and immersive manner, allowing learners to follow the lesson at their own pace while remaining engaged. Meanwhile, in the PowerPoint group, teacher-led explanations using slides facilitated interaction, immediate clarification of concepts, and guided exploration of ideas, helped learners feel supported and confident in completing the tasks.

The improvement in learners’ satisfaction observed in both groups is consistent with existing literature on multimedia-based instruction. Mayer (2021) stated that multimedia learning environments coupled with visual and auditory elements can enhance learners’ engagement and comprehension by facilitating deeper cognitive processing. In the same way, Wong and Adesope (2021) emphasized that multimedia instruction incorporating various forms of stimulation can sustain learners’ attention and increase their motivation. Furthermore, Noetel et al. (2022) reported that well-designed multimedia learning materials significantly improve both learners’ motivation and academic outcomes. These findings are further supported by Dahlan et al. (2023), who highlighted that multimedia-based instruction accommodates diverse learning styles and promotes deeper processing of information, thereby increasing learners’ satisfaction and engagement.

Moreover, the results also support the motivational framework of Keller and Suzuki (2021) which emphasized that learners’ satisfaction increases when they experience success and receive meaningful feedback during the learning process. Castillo and Towler (2023) noted that learners are more likely to remain engaged and motivated when instructional strategies provide opportunities for achievement and positive reinforcement. In the present study, the improvement in learners’ satisfaction may be attributed to the interactive and visually stimulating nature of multimedia instruction, which allows learners to better understand complex concepts and experience a sense of accomplishment after completing learning tasks.

Significant Difference of the Academic Performance in Biology

Table 7 presents the Analysis of Covariance (ANCOVA) results examining whether a significant difference exists in the post-test academic performance of Grade 9 Biology learners when taught using vodcasts and PowerPoint presentations, with pre-test scores treated as a covariate. The model explains a substantial proportion of variance in post-test scores, as indicated by the reported coefficient of determination ($R^2 = .528$), suggesting that the instructional intervention and baseline performance jointly contributed to learners’ outcomes.

Source	Type III Sum of Squares	df	Mean Square	F-value	p-value
Corrected Model	3370.178 ^a	2	1685.089	43.109	.000
Intercept	3981.859	1	3981.859	101.868	.000
Pretest	838.928	1	838.928	21.462	.000
Treatment	1334.053	1	1334.053	34.129	.000
Error	3009.822	77	39.089		
Total	121900.000	80			
Corrected Total	6380.000	79			

Note. a. R Squared = .528 (Adjusted R Squared = .516)
 Dependent Variable: Posttest
 *Significant at p<0.05 alpha level

The ANCOVA results reveal that both the pre-test and the instructional treatment significantly influenced post-test academic performance. The covariate (pre-test) yielded a statistically significant effect ($p < .000$), indicating that learners’ initial knowledge levels were strongly associated with their subsequent performance. Moreover, the treatment effect was also statistically significant ($p < .000$), demonstrating

that academic performance differed meaningfully between learners exposed to vodcast instruction and those taught using PowerPoint. The large F value associated with the treatment suggests a substantial divergence in adjusted post-test means between the two groups after controlling for baseline differences. Furthermore, the corrected model itself was highly significant ($p < .000$), confirming that the combination of pre-test scores and instructional modality provided a robust explanation of learners' academic outcomes.

The findings indicate that the type of instructional approach exerted a significant influence on learners' academic performance in Biology beyond what could be explained by prior knowledge alone. After adjusting for pre-test differences, learners exposed to vodcast instruction achieved significantly different and presumably higher post-test scores compared with those exposed to PowerPoint instruction. This suggests that vodcasts may offer pedagogical advantages, due to their capacity to present complex biological concepts through synchronized audio-visual explanations, narrative continuity, and learner-controlled pacing. This further implies that instructional design plays a decisive role in facilitating deeper comprehension and knowledge retention, particularly in content-heavy subjects. Essentially, the intervention appears to have transformed the learning experience from one characterized by passive reception to one marked by active cognitive engagement.

This study aligns with an increasing body of literature indicating that multimedia-based instruction enhances academic performance more effectively than conventional presentation approaches. Specifically, multimedia learning environments that integrate text, visuals, and audio facilitate deeper cognitive processing while simultaneously minimizing extraneous cognitive load, thereby improving learners' comprehension and retention (Noetel et al., 2022). Furthermore, video-based instructional formats such as vodcasts allow learners to visualize dynamic processes and revisit explanations whenever necessary, which in turn supports understanding of complex or abstract concepts frequently encountered in science education (Espinoza et al., 2022). In addition, Paman-Viador and Dioso (2023) stated that learners exposed to video-based or multimedia instruction tend to outperform those taught using PowerPoint presentation. Similarly, Kassa et al. (2024) reported significant improvements in biology achievement when dynamic multimedia instruction was implemented, attributing these gains to heightened learner engagement and clearer conceptual understanding.

On the other hand, PowerPoint presentations have also been found to support academic performance, particularly in organizing content and improving clarity of instruction. Research by Petruse et al. (2024) indicates that PowerPoint can enhance learners' understanding when effectively designed with appropriate visuals and structured delivery. This was aligned by the study of Zamiri and Esmaili (2024) that academic performance involves the ability to comprehend and communicate knowledge effectively, as organized presentations can aid in knowledge acquisition. However, contrasting findings suggest that the effectiveness of PowerPoint is not always consistent. Ho and Mun (2026) found that text-heavy or poorly designed slides may hinder retention and reduce learner engagement, while Reddi et al. (2025) reported that PowerPoint does not necessarily result in higher academic performance compared to traditional teaching methods.

Significant Difference of Learners' Motivation in Biology

Table 8 outlines the Analysis of Covariance (ANCOVA) results examining whether a significant difference exists in the post-test motivation of Grade 9 Biology learners when taught using vodcasts and PowerPoint presentations, with pre-test motivation scores treated as a covariate. The table summarizes the

Type III sum of squares, degrees of freedom, mean squares, F statistics, and significance values for the model components, including the covariate and treatment factor. The relatively small coefficient of determination ($R^2 = .032$) indicates that only a modest proportion of variance in post-test motivation is explained by the model, suggesting that factors beyond the instructional modality may have influenced learners’ motivational outcomes.

Source	Type III Sum of Squares	df	Mean Square	F-value	p-value
Corrected Model	.316 ^a	2	.158	1.272	.286
Intercept	27.399	1	27.399	220.395	.000
Pretest	.261	1	.261	2.101	.151
Treatment	.074	1	.074	.592	.444
Error	9.573	77	.124		
Total	1426.975	80			
Corrected Total	9.889	79			

Note. a. R Squared = .032 (Adjusted R Squared = .007)
 Dependent Variable: Posttest
 *Significant at p<0.05 alpha level

Table 8. One-Way ANCOVA Summary on Learners’ Motivation in Biology

The ANCOVA results reveal that neither the covariate nor the treatment produced a statistically significant effect on post-test motivation. The pre-test motivation score did not significantly predict post-test motivation ($p = .151$), indicating that baseline motivational differences were not strongly associated with learners’ subsequent motivation levels. More importantly, the treatment effect comparing vodcast and PowerPoint instruction was not statistically significant ($p = .444$), suggesting that the two instructional approaches resulted in comparable motivational outcomes after controlling for pre-test scores. Likewise, the overall corrected model was not significant ($p = .286$), further reinforcing the observation that the instructional modality did not meaningfully account for variation in learners’ motivation. These results imply that, although both groups showed improvements in motivation based on descriptive findings, the differences between vodcasts and PowerPoint presentations were not statistically significant.

This indicates that both vodcast and PowerPoint instruction were similarly effective in influencing learners’ motivation, with neither approach demonstrating a clear advantage over the other. This suggests that motivation may be shaped less by the specific technological format and more by broader instructional factors such as teacher facilitation, classroom climate, perceived task value, and individual learner characteristics (Desai & Kulkarni, 2022). It is plausible that both modalities provided sufficiently engaging and meaningful experiences to elevate motivation to comparable levels, thereby diminishing observable differences between groups (Das et al., 2025). Moreover, motivation is inherently dynamic and multifaceted, often influenced by internal dispositions and contextual variables that extend beyond the immediate instructional tool. Consequently, while multimedia integration may enhance motivation overall, the choice between vodcast and PowerPoint alone may not be decisive in producing differential motivational effects (Barrett et al. (2024).

The absence of a significant difference aligns with research indicating that technology integration does not automatically guarantee higher motivation unless accompanied by sound pedagogical design and meaningful learning experiences. Keller’s ARCS model emphasizes that attention, relevance, confidence,

and satisfaction depend not merely on media format but on how instruction addresses learners' psychological needs (Keller & Suzuki, 2021). Research has shown that both video-based instruction and well-designed PowerPoint presentations can enhance engagement and motivation when aligned with learners' needs and learning objectives (Jasrina & Siregar, 2024).

In addition, Noetel et al. (2022) mentioned that simply adding multimedia does not ensure improved motivation; poorly aligned or overly complex materials may yield negligible benefits. Other research suggests that classroom interaction, feedback quality, and perceived usefulness of the content often exert stronger influences on motivation than the medium itself (Howard et al., 2021; Castillo & Towler, 2023). Thus, the present findings confirmed the view that while multimedia-based instruction can support motivation, the specific format such as podcast or PowerPoint may not independently produce significantly different motivational outcomes.

Findings, Conclusions, and Recommendations

Findings

From the analyses of data, the following findings were derived:

1. The learners' academic performance attained a *very satisfactory* level after they were taught using podcasts, whereas fairly *satisfactory* level to those learners who were taught using PowerPoint presentations. Podcasts have potentially increased learners' academic performance.
2. The learners' level of motivation achieved a *very highly motivated* level after they were taught using podcasts and PowerPoint presentations. Both groups are similar regarding the four motivational dimensions: attention, relevance, confidence, and satisfaction.
3. There is a significant difference in learners' performance in Biology between the learners taught using podcasts and PowerPoint presentations favoring the podcasts group. This indicates that podcasts were more effective in enhancing academic performance.
4. There is no significant difference in learners' motivation in Biology between the learners taught using podcasts and PowerPoint presentations. However, results indicate that podcasts were more effective in increasing learners' engagement and learning Biology.

Conclusions

From the findings, the following conclusions were made:

1. Podcasts proved to be highly effective in enhancing learners' academic performance in Biology. Although both podcasts and PowerPoint presentations contributed to improvements in academic performance, learners exposed to podcast instruction demonstrated greater gains in understanding Biology concepts, as reflected in their assessment scores.
2. The use of podcasts and PowerPoint presentations significantly supports the development of learners' attention, relevance, confidence, and satisfaction which are essential components of motivation in the learning process.
3. The dynamic features of podcasts improved learners' conceptual understanding. In addition, its unique characteristics catered to diverse learning styles, which in turn contributed to better academic performance.
4. The implementation of podcasts and PowerPoint presentations contribute to a positive increase in learners' motivation toward learning Biology.

Recommendations

In light of the conclusions of the study, the following recommendations are put forth:

1. Learners may utilize vodcasts and PowerPoint presentations in the learning process to enhance their academic performance and motivation in Biology. Through the use of these multimedia tools, learners can better visualize lesson concepts that may otherwise be difficult to understand, thereby leading to improved learning outcomes.
2. Teachers are encouraged to integrate vodcasts into their teaching strategies as these provide an engaging approach that can stimulate learners' interest. As education continues to evolve, the use of vodcast resources supports 21st century teaching practices by allowing teachers to incorporate real-world contexts into their lessons.
3. School administrators and officials from the Department of Education (DepEd) may organize professional development programs and training sessions for teachers to strengthen their competencies in developing vodcasts. These initiatives may be incorporated into the School Improvement Plan (SIP) and supported through technical assistance during School Learning Action Cell (SLAC) sessions and In-Service Training (INSET).
4. The data obtained in this study may serve as a valuable baseline for future research. The findings may provide insights into the effectiveness of multimedia-based instruction in improving learners' academic performance and motivation, while also identifying areas for further investigation, such as determining which types of video content are most effective and engaging for learners.

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