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Multimedia-Assisted Learning Activities and Academic Performance of Grade 11 STEM Strand Students in Congressional District I, Batangas Province

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Abstract

The widespread use of multimedia in communication, entertainment, business, and especially in education has encouraged many educators to incorporate multimedia in their classroom instruction. Based on the assessed low scores in formative tests and quizzes in selected topics in General Biology, the study aims to assist the students through the integration of multimedia applications in their learning activities.

The research method employed was a descriptive research design, applying the purposive sampling method to select 296 Grade 11 STEM students from public senior high schools in Congressional District 1, Division of Batangas. Data were analyzed using frequency, percentage, weighted mean, ranking, and Person's r correlation coefficient to determine the relationships between variables.

Findings revealed multimedia-assisted learning activities were moderately useful in terms of teaching and learning process, multimedia resources, and online/offline applications, and students acknowledged that it is helpful in improving their class participation to a moderate extent in terms of their assessment and written works, while to a great extent for performance tasks.

Results indicated a statistically significant positive relationship between class participation and teaching and learning process and multimedia resources, with the *p*-value of <.001, but a very weak correlation between online/offline applications, with a *p-value* of >.05, for performance tasks and written works. On the other hand, assessments obtained a *p-value* of .018, although very weak, it is still statistically significant.

Based on the results, enrichment activities focusing on the integration of various multimedia applications in learning activities were proposed to improve understanding of complex scientific topics.

Keywords: *Multimedia-Assisted Learning Activities, Class Participation, Online/Offline Application, Enrichment Activities*

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Introduction

The increasing exposure of students to digital tools such as cellphones, laptops, and other forms of new media nowadays leads to shorter attention spans among students. So, educators must be oriented with recent technology and apply it in their classroom instruction by making creative and innovative presentations that could make learning fun, enjoyable, and engaging.

Since Senior High School students are the stage wherein they should get ready to decide what path they will take after their exit, whether it be entrepreneurship, applying for jobs, or continuing their academic journey in their chosen career, they should be equipped with the necessary knowledge and skills. This can be possible if they had really had a good grasp of the lessons and understood every concept well.

Despite the recognized importance of integrating multimedia-assisted learning activities in Science at the Senior High School level, it is not fully implemented. Moreover, studies often emphasize only the general effectiveness of multimedia in education, but limited attention has been given to class participation in the Senior High School curriculum.

In the context of Congressional District I, in the area of Tuy Senior High School, the researcher observed that some Grade 11 STEM students are experiencing difficulty in comprehending and retaining scientific concepts, particularly in General Biology, as manifested by their low scores in the formative test, quizzes, and quarterly assessment that can be seen in the teacher's E-class record.

In line with this, the study aims to assist the STEM Grade 11 students in the subject General Biology through the integration of multimedia-assisted learning activities.

This study aims to assess the level of usefulness of integrating multimedia-assisted learning activities and the extent of students' class participation. Specifically, it seeks to answer the following questions:

1. What is the level of usefulness of integrating multimedia-assisted learning activities in terms of:

    1.1 teaching learning process;

    1.2 multimedia resources; and

    1.3 online/offline applications?

2. How may the extent of class participation of students be described in terms of:

    2.1 assessments;

    2.2 performance tasks; and

    2.3 written works?

3. Is the ra significant relationship between the assessments on the level of usefulness of integrating multimedia-assisted learning activities and on the extent of students' class participation

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in Science?

4. What challenges are faced by Grade 11 STEM students in accessing and utilizing multimedia-assisted learning activities?
5. What enrichment activities in Science may be proposed?

Hypothesis

There is no significant relationship between the assessments on the level of usefulness of integrating multimedia-assisted learning activities and on the extent of class participation of the students.

Methodology

Research Design

This study employed a quantitative descriptive research design to determine the level of usefulness of integrating multimedia-assisted learning activities and the extent of students' class participation, as well as to examine the relationship between these variables. The descriptive method was used to systematically describe the level of usefulness of integrating multimedia-assisted learning activities in terms of the teaching and learning process, multimedia resources, and online/offline applications. Meanwhile, the correlational approach was utilized to determine whether a significant relationship exists between the integration of multimedia-assisted learning activities and the students' extent of class participation. This design is appropriate as it allows the researcher to analyze patterns, trends, and relationships without manipulating variables.

Participants

The respondents of the study consisted of 296 Grade 11 STEM strand students enrolled in public senior high schools in Congressional District 1, Batangas Province, during the School Year 2025–2026. The participants were selected using a purposive sampling technique because a specific strand in Senior High School was included in the study. These students were considered appropriate respondents as they are taking a specialized subject only offered in the STEM strand, which is General Biology, where some of the topics are complex and abstract.

Research Instrument

The primary instrument used in this study was a researcher-made questionnaire designed to gather data on the usefulness of integrating multimedia-assisted learning activities, extent of students' class participation and challenges encountered.

The questionnaire underwent validation by experts in education to ensure content validity, clarity, and reliability before administration.

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Data Collection Procedure

Prior to data collection, the researcher secured permission from school authorities to conduct the study. After approval was granted, the researcher coordinated with teachers for the proper distribution of the questionnaire. The respondents were oriented regarding the purpose of the study, and confidentiality of their responses was assured. With approval granted, the questionnaires were distributed using in-person methods within a given time frame. After completion, all questionnaires were collected, checked, and organized for data analysis. Ethical considerations were strictly observed, ensuring that participation was voluntary and that all responses were treated with confidentiality.

Data Analysis

The data were analyzed using appropriate statistical tools. Frequency and percentage described the respondents' profile, while weighted mean and ranking determined the levels and significance of variables. Pearson's r was used to test the relationship between multimedia-assisted learning activities and the extent of students' class participation. All results were interpreted using corresponding verbal interpretations.

Results

Table 1

Teaching and Learning Process

Statement *I …*	Weighted Mean	Verbal Interpretation	Ranking
1. feel more at ease and confident	3.57	*Very Useful*	3
2. communicate my ideas clearly and effectively	3.60	*Very Useful*	2
3. develop a deeper understanding of the learning content	3.62	*Very Useful*	1
4. apply learning strategies that match my preferred learning style	3.52	*Very Useful*	4
5. use strategies that combine lesson content with games or interactive elements	3.45	*Moderately Useful*	6
6. connect my knowledge and skills with the required learning competencies	3.51	*Very Useful*	5

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7. use a variety of interactive materials	3.40	*Moderately Useful*	8
8. utilize mobile learning applications to support my learning process	3.23	*Moderately Useful*	10
9. use multimedia tools when completing or presenting my outputs	3.41	*Moderately Useful*	7
10. reflect on feedback and adjust my use of multimedia tools to improve my learning	3.37	*Moderately Useful*	9
Composite Mean	**3.47**	**Moderately Useful**	

Table 2
Multimedia Resources

Statement	Weighted Mean	Verbal Interpretation	Ranking
1. The school has accessible Wi-Fi facilities.	2.27	*Slightly Useful*	10
2. Classrooms are equipped with a television or overhead projectors.	3.51	*Very Useful*	1
3. Online platforms are used for communication	3.37	*Moderately Useful*	3
4. Applications and programs are available for use	3.15	*Moderately Useful*	4
5. Applications and programs used in the classroom are easy to download	2.92	*Moderately Useful*	7
6. Training sessions are provided for the use of electronic facilities	2.67	*Moderately Useful*	9
7. Assistance is available in using the provided technology	3.11	*Moderately Useful*	6
8. Students are given opportunities to prepare presentations and projects online	3.49	*Moderately Useful*	2

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9. Quizzes and activities are provided through online platforms	2.74	*Moderately Useful*	8
10.Mobile applications are available for use	3.12	*Moderately Useful*	5
Composite Mean	**3.04**	**Moderately Useful**	

Table 3
Online/Offline Applications

Statement *I use…*	**Weighted Mean**	**Verbal Interpretation**	**Ranking**
1. Presentation tools such as Canva, Google Slides, PowerPoint, Prezi.	3.82	*Very Useful*	1
2. Platforms like Google Classroom, Seesaw, ClassDojo	2.60	*Moderately Useful*	5.5
3. Game-based platforms/applications like Kahoot, Quizlet, and BioQuiz	2.60	*Moderately Useful*	5.5
4. Assessment tools like Edpuzzle and Google Forms.	2.66	*Moderately Useful*	3
5. Digital learning tools such as Padlet and Wordwall.	2.10	*Slightly Useful*	8
6. Virtual laboratories such as Virtual Biology Lab, Labster, OLabs.	2.16	*Slightly Useful*	7
7. Simulation tools such as PhET, Interactive Simulations, and BioInteractive.	2.01	*Slightly Useful*	10
8. Concept mapping such as Coggle and Mindomo	2.09	*Slightly Useful*	9
9. Project-based digital tools such as Canva, Google Slides/ PowePoint.	2.65	*Moderately Useful*	4
10. Interactive PowerPoint presentation.	3.56	*Very Useful*	2
Composite Mean	**2.72**	**Moderately Useful**	

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Table 4
Assessments

Statement *I …*	Weighted Mean	Verbal Interpretation	Ranking
1. feel more prepared for the upcoming quizzes, exams, and summative tests	3.40	*Moderate Extent*	6
2. identify the concepts that I need to review before the exam and summative tests	3.54	*Great Extent*	1
3. study independently before the examination	3.42	*Moderate Extent*	3
4. stay focused while answering questions during exams and quizzes	3.41	*Moderate Extent*	4.5
5. quickly recall concepts and illustrations to support my answer	3.37	*Moderate Extent*	7
6. apply what I have learned in class to answer different types of questions	3.41	*Moderate Extent*	4.5
7. analyze test questions carefully	3.50	*Great Extent*	2
8. evaluate the correctness of my answers	3.36	*Moderate Extent*	8
9. feel more confident during the examination and quizzes	3.25	*Moderate Extent*	10
10. observe improvement in my exam and summative test scores	3.33	*Moderate Extent*	9
Composite Mean	**3.40**	**Moderate Extent**	

Table 5
Performance Tasks

Statement *I …*	Weighted Mean	Verbal Interpretation	Ranking
1. pay close attention to instructions	3.55	*Great Extent*	3
2. apply the concepts learned during class	3.56	*Great Extent*	2
3. understand the criteria for evaluating outputs	3.53	*Great Extent*	4.5

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4. develop the necessary skills in completing the tasks	3.48	*Moderate Extent*	6
5. acquire skills learned from the performance tasks	3.61	*Great Extent*	1
6. design impressive outputs such as projects, presentations, and portfolios	3.46	*Moderate Extent*	7.5
7. develop projects or presentations related to real-life situations	3.43	*Moderate Extent*	9
8. create outputs relevant to the subject's present lesson	3.53	*Great Extent*	4.5
9. complete and submit tasks on time	3.46	*Moderate Extent*	7.5
10. overcome difficulties when completing the tasks	3.38	*Moderate Extent*	10
Composite Mean	**3.50**	**Great Extent**	

Table 6
Written Works

Statement ***I …***	**Weighted Mean**	**Verbal Interpretation**	**Ranking**
1. pay close attention to written instructions in essays	3.49	*Moderate Extent*	2
2. organize my ideas clearly when answering essays or open-ended questions	3.42	*Moderate Extent*	4.5
3. apply the strategies learned in written reflections	3.42	*Moderate Extent*	4.5
4. answer open-ended questions correctly	3.53	*Great Extent*	1
5. stay focused when completing the written tasks	3.40	*Moderate Extent*	6
6. evaluate the correctness of my answers in written works	3.44	*Moderate Extent*	3
7. feel more confident in writing essays and reflection papers	3.29	*Moderate Extent*	10

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8. find writing essays and reflection papers enjoyable and engaging	3.38	*Moderate Extent*	8
9. complete written tasks within the allotted time	3.39	*Moderate Extent*	7
10. achieve better scores in essays and reflection papers	3.34	*Moderate Extent*	9
Composite Mean	**3.41**	**Moderate Extent**	

Table 7
Teaching and Learning Process and the Level of Participation in Science

Variable	r-value	Degree	p-value	Decision on H0	Interpretation
Assessment	.358	Moderate	<.001	Reject	Significant
Performance Tasks	.449	Moderate	<.001	Reject	Significant
Written Works	.378	Moderate	<.001	Reject	Significant

Table 8
Multimedia Resources and the Level of Class Participation in Science

Variable	r-value	Degree	p-value	Decision on H0	Interpretation
Assessments	.300	Weak	<.001	Reject	Significant
Performance Task	.316	Moderate	<.001	Reject	Significant
Written Works	.287	Weak	<.001	Reject	Significant

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Table 9
Online/ Offline Applications and the Level of Class Participation

Variable	r-value	Degree	p-value	Decision on H0	Interpretation
Assessments	.138	Very Weak	.018	Reject	Significant
Performance Task	.112	Very Weak	.055	Failed to Reject	Not Significant
Written Works	.096	Very Weak	.101	Failed to Reject	Not Significant

Table 10
Challenges Faced

Statement	Weighted Mean	Verbal Interpretation	Ranking
1. Hesitation to explore multimedia independently	3.06	*Agree*	7
2. Limited internet connection at school	3.56	*Strongly Agree*	1
3. Lack of confidence in using digital tools	3.00	*Agree*	10
4. Sensitivity of the eyes to screen lightning	3.04	A*gree*	9
5. Short class time to fully explore multimedia resources	3.21	*Agree*	5
6. Distraction from other social media and other websites	3.36	*Agree*	2
7. Lack of creativity in making multimedia-assisted presentations or projects	3.05	*Agree*	8
8. Difficulty in applying knowledge from multimedia into a real-world context	3.07	*Agree*	6
9. Inadequacy of multimedia resources in school, such as computers, tablets, and televisions	3.33	*Agree*	3
10. Unawareness of students with other multimedia- assisted tools	3.31	*Agree*	4
Composite Mean	**3.19**	**Agree**	

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Proposed Enrichment Activities in Science

Areas of Concern	Description	Objectives	Activity Name	Activity Title	Person Involved	Time Frame	Expected Outcomes
Teachers' use of a variety of interactive learning materials	Enhance students' understanding of complex science concepts through the use of multimedia, such as videos, simulations, and digital presentations	To use different interactive tools in presenting a lesson To incorporate video-based concept exploration To utilize interactive simulations	SCI-TECH (**S**cience **C**oncept **I**nstruction through **T**echnology **E**nhanced **C**lassroom for **H**igher education)	Virtual Laboratory on Animal Organs	Teachers Students	60 mins	Students have identified and explored the organs of the body of an animal (white mice)
				Simulation on Natural Selection	Teacher Student	60 mins	Students have explained the concept of Natural Selection
				Video-based on Genetic Engineering	Teacher Student	60 mins	Students have determined how organisms are genetically modified
Regularly assess and adjust multimedia integration strategies based on feedback, observations, and experiences	Assess the students regularly through the use of multimedia tools and to adjust teaching strategies based on feedback, observation, and experiences	To use multimedia tools in giving quizzes To apply game-based assessment	AIM (**A**ssessment through the **I**ntegration of **M**ultimedia)	Kahoot on diagnostic assessment	Teacher Students	10 mins.	Students have actively participated during diagnostic test
				Quizizz on formative assessment	Teacher Students	10 mins	Students have experienced an interactive assessment after the lesson
				Padlet on Portfolios	Teacher Students	20 mins	Students have presented their output and receive feedback immediately
				Google Forms for Summative test	Teacher Students	20 mins	Students answered the assessment online and are given feedback through the immediate generation of a score
Uses mobile learning applications to facilitate the learning process	Use mobile applications to facilitate the learning process	To utilize mobile learning applications in science, like BioQuiz, Learn Biology, and Games	MOBILE-APP **MO**bile-**B**ased **I**ntegrated **L**earning to **E**nhance **A**cademic **P**erformance and **P**rojects	BioQuiz for formative assessment in Cell Structure and Function	Teacher Students	20 mins	Students used engaging mobile applications in their formative assessments, at the same time, linked to the lesson already, for retention of concepts.
				Learn Biology & Games on Molecular DNA	Teacher Students	20 mins	Students explored different topics in Biology with fun and engaging theory chats accompanied by interactive lessons.

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		To create a presentation/ project by the use of multimedia		Mobile applications on Cell Structure and Function	Teacher Students	20 mins	Students have identified cell structure and determine the function of each
Accessibility of Wi-Fi facilities	Encourage the use of offline multimedia applications	To give feedback To provide an alternative way to create multimedia presentations using offline applications such as Microsoft PowerPoint, Microsoft Publisher	AVAIL-TO **A**vailability of **V**arious **A**ccessible **I**nteractive **L**earning **T**ools **O**ffline	Video Editing applications like CapCut in the presentation of Homeostasis	Teacher Students	60 mins	Students have produced a video about Homeostasis
				Downloaded videos on Cellular Respiration, Photosynthesis Genetic Engineering	Teacher Students	10 mins	Students have understand complex topic like cellular respiration and photosynthesis
		To encourage the use of downloadable mobile applications, a video editor To use a downloadable video about the topic		Padlet for performance output	Teacher Students	20 mins	Students have submitted performance output in Comparing and Contrasting Plants and Animals' Organ System in Padlet
Utilization of Multimedia through learning tools such as Padlet and Wordwall	Facilitate the use of multimedia in the learning activities of the students	To use variety of multimedia tools such as Padlet and Wordwall	MULTI-SCI **M**ultimedia **U**tilization as **L**earning **T**ools to **I**ncrease **S**cience **C**oncept	Wordwall for recall of previous topics on Taxonomy	Teacher Students	20 mins	Students recalled previous topics in Cellular Respiration through Wordwall

Unavailability of quizzes and activities in online platforms	Use an online platform to facilitate assessments after a lesson	To use Google Classroom as an alternative for the submission of projects and formative assessment through Google Forms	E-MAIL **E**lectronic **M**essaging of **A**ssessments **I**ntegrated into **L**earning	Google Forms for Formative Assessments	Teacher Students	20 mins	Students learning from science concepts have been assessed through Google Forms
		To use Padlet in collecting students' portfolios and other performance tasks		Padlet for creating diagrams in Comparing and Contrasting Animals and Plants	Teacher Students	30 mins	Students have done and submitted their output in Padlet
				Digital Portfolio on Genetic Engineering	Teacher Students	60 mins	Students have posted their digital portfolios in Padlet
				Interactive presentation through the use of Canva and Google Slides	Teacher Students	60 mins	Students have been able to present a creative and interactive output using Canva and Google Slides
Unavailability of Training sessions for the use of electronic facilities	Provide training sessions for students in the use of multimedia applications	To introduce a new multimedia tool To demonstrate the use of the multimedia tools	TRAIN **T**raining on **R**esources and **A**ssistance in the **I**ntegration of **N**ew multimedia in learning	Microsoft Publisher and Microsoft PowerPoint on the Presentation of Cellular Respiration	Teacher Students	60 mins	Students have been able to create presentations through the interactive PowerPoint Presentation

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				Coggle on Geologic Time Scale	Teacher Students	20 mins	Students have been able to recall previous topics using Wordwall
Utilization of concept mapping, such as Coggle, Mindomo	Encourage the use of concept mapping incorporated with multimedia tools	To introduce variety of multimedia tools, such as Coogle and Mindomo, in making a concept map	MAP **M**ind-mapping as **A**ssistance in making **P**erformance tasks	Mindomo on Prokaryotic and Eukaryotic Cell	Teacher Student	30 mins	Students have been able to create a concept map about Geologic Time Scale through the use of Coggle
					Teacher Student	10 mins	Students have been able to use Mindomo in making a concept map about the topic Prokaryotic and Eukaryotic Cell
					Teacher Student	30 mins	Student have been able to explore PhET simulation to understand Natural Selection and Genetic Engineering
Utilization of simulation tools like PhET interactive simulation BioInteractive	Facilitate the use of interactive simulation in the lesson in Biology	To use different interactive simulation such as PhET and BioInteractive	SIM **S**imulation tools **I**ntegration for **M**astery of concepts	PhET interactive simulation on Natural Selection and Genetic Engineering	Teacher Students	30 mins	Student have been able to use Bioquiz in their formative assessments
Limited internet connection at school	Provide alternative methods in facilitating interactive lesson in the classroom	To use off-line interactive multimedia tools in facilitating teaching and learning	LIMITATION **L**earning **I**ntegrated With **M**ultimedia together with **I**nnovative **T**eaching using **A**ligned **T**ools **I**ntegrated to **O**ffline **N**ew multimedia	Bioquiz on Cell Structure and Function	Teacher Students	10 mins	Students have been able to present their output using Video and Photo Editing Applications
		To create performance tasks through the use of downloadable multimedia tools like video making through the use of CapCut, Photo editing through		Video presentation on the topic Homeostasis and Photo editing applications on Transport Mechanism	Teacher Students	30 mins	Students have been able to create presentations using Microsoft PowerPoint
		To use interactive powerpoint in group presentation		Microsoft PowerPoint presentation on Cellular Respiration and Photosynthesis	Teacher Students	20 mins	Students have been able to use downloadable applications as alternative for online websites
Distraction from other social media and other websites	Lessen exposure to online websites	To utilize downloadable multimedia tools such as BioQuiz,	MEDIA **M**ultimedia **E**scape through **D**ownloadable	BioQuiz and Learn Biology and Games on	Teacher Students	30 mins	Students have been able to use offline tools to facilitate

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		Learn Biology, Games, and Interactive PowerPoint Presentation	**I**nteractive **A**ssistance	formative assessments Interactive PowerPoint Presentation on Cellular Respiration	Teacher Students	30 mins	teaching and learning Students were able to create Cellular Respiration presentation through MS PowerPoint
Inadequacy of multimedia resources in schools, such as computers, tablets, and televisions	Facilitate teaching and learning through the use of available learning materials	To use improvised materials to represent multimedia, such as the creation of an interactive storyboard	ASSIST **A**daptive **S**upplemental **S**trategies **I**n **S**cience **T**eaching	Storyboard on Aerobic Respiration	Teacher Students	30 mins	Students were able to create a storyboard showing the process of Aerobic Respiration
				Concept mapping on Transport Mechanism	Teacher Students	30 mins	Students were able to create a concept map on Transport Mechanism

Discussion

The research focused on assessing the level of usefulness of integrating multimedia-assisted learning activities and the extent of students' class participation in Congressional District I. After thorough analysis of the gathered data, the study yielded the following findings

1. Usefulness of Multimedia-Assisted Learning Activities

1.1 Teaching and Learning Process

The result suggests that the students acknowledged that when multimedia applications are incorporated into their learning activities, they can have a thorough understanding of the lesson. It yielded a composite mean of 3.47, verbally interpreted as Moderately Useful. The indicator I develop a deeper understanding of learning content came out as one of the highest ranks, with a weighted mean of 3.62, interpreted as Very Useful. This is followed by I communicate my ideas clearly and effectively, with a weighted mean of 3.60 and verbally interpreted as Very Useful. I feel more at ease and confident, ranked 3rd with a weighted mean of 3.57, interpreted also as Very Useful. Meanwhile, the item I use a variety of interactive materials ranked 8th with a weighted mean of 3.40 and verbally interpreted as Moderately Useful. The indicator I reflect on feedback and adjust my use of multimedia tools to improve my learning students ranked 9th with a weighted mean of 3.37, verbally interpreted as Moderately Useful. Lastly, the statement I utilize mobile learning applications to support my learning process, ranked the lowest with a weighted mean of 3.23, interpreted as Moderately Useful.

This reflects that the use of a multimedia-assisted learning activities may promote mastery of learning content and retention of abstract concepts but a variety of it is needed for teaching and learning to be engaging and effective.

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1.2 Multimedia Resources

Regarding multimedia resources, students recognized that resources are Moderately Useful, with a composite mean of 3.04. They acknowledged that their classrooms are equipped with a television or overhead projector ranked 1st, with a weighted mean of 3.51, and verbally interpreted as Very Useful. The indicator Students are given opportunities to prepare presentations and projects online ranked 2nd with a weighted mean of 3.49 and was verbally interpreted as Moderately Useful followed the statement online platforms are used for communication which ranked 3rd with a weighted mean of 3.37 and was interpreted as Moderately Useful. However, the indicator quizzes and activities are provided through online platforms ranked 8th with a weighted mean of 2.74, interpreted as Moderately Useful, along with the statement that training sessions are provided for the use of electronic facilities that ranked 9th with a weighted mean of 2.67. Lastly, the item school has accessible Wi-Fi facilities, ranked the lowest with a weighted mean of 2.27, which is interpreted as Slightly Useful.

This reflects that even if multimedia resources and applications are available and ready to be utilized in the classroom, limited internet connections hinder their full implementation.

1.3 Online/Offline Applications

The findings revealed that learners possess varying responses to the online and offline applications, with a composite mean of 2.72, verbally interpreted as Moderately Useful. Students demonstrated a positive response to the usefulness of multimedia through the use of presentation tools such as Canva, Google Slides, PowerPoint, and Prezi, which ranked the highest with a weighted mean of 3.82, interpreted as Very Useful. The indicator I use interactive PowerPoint presentation, ranked 2nd with a weighted mean of 3.56 and was interpreted as Very Useful, followed by the statement I use assessment tools like Edpuzzle and Google Forms, which ranked 3rd with a weighted mean of 2.66 and was verbally interpreted as Moderately Useful. On the other hand, the indicator I use digital learning tools such as Padlet and Wordwall, ranked 8th with a weighted mean of 2.10 and interpreted as Slightly Useful, along with the item I use concept mapping, such as Coggle and Mindomo, which ranked 9th with a weighted mean of 2.09. Finally, the statement I use simulation tools such as PheT Interactive Simulations and BioInteractive, ranked the lowest with a weighted mean of 2.01, and was verbally interpreted as Slightly Useful.

This implies that students use Canva and PowerPoint most of the time but are less familiar with other online/offline multimedia applications.

2. Students' Level of Performance

2.1 Assessments

Regarding assessments, students recognized that multimedia-assisted learning activities help them in various ways, with a composite mean of 3.40 interpreted as Moderate Extent. The indicator I can identify the concepts I need to review before the exam and summative test ranked the highest, with a weighted mean of 3.54, verbally interpreted as Great Extent. The indicator I analyze test

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questions carefully ranked 2nd with a weighted mean of 3.50, verbally interpreted as Great Extent, followed by the item I study independently before the examination, which ranked 3rd with a weighted mean of 3.42 and was interpreted as Moderate Extent. However, the item I evaluate the correctness of my answers ranked 8th with a weighted mean of 3.36, verbally interpreted as Moderate Extent, followed by the statement I observe improvement in my exam, which ranked 9th with a weighted mean of 3.33 and was interpreted as Moderate Extent. Lastly, the indicator I feel more confident during the examination, and quizzes ranked the lowest with a weighted mean of 3.25 and interpreted as Moderate Extent.

This suggests that appropriate multimedia-assisted learning activities may aid in understanding complex concepts that may contribute to improvement in test scores.

2.2 Performance Tasks

Students acknowledged that multimedia-assisted learning activities affect their performance tasks positively, as evidenced by the yielded composite mean of 3.50, verbally interpreted as Great Extent. The indicator I acquire skills learned from performance tasks ranked the highest with a weighted mean of 3.61, interpreted as Great Extent. The indicator I apply the concepts learned during class ranked 2nd with a weighted mean of 3.56, verbally interpreted as Great Extent, followed by the item I pay close attention to instruction, which ranked 3rd with a weighted mean of 3.55 and was interpreted as Great Extent. Meanwhile, the statements I design impressive outputs such as projects, presentations, and portfolios, and I complete and submit tasks on time, both ranked 7.5 with a weighted mean of 3.46, interpreted as Moderate Extent. The statement I develop projects and presentations related to real-life situations ranked 9th with a weighted mean of 3.43, interpreted as Moderate Extent. Finally, the item I overcome difficulties when completing the task, ranked the lowest with a weighted mean of 3.38, interpreted as Moderate Extent.

This reflects that multimedia-assisted learning activities can help students learn skills that they can apply in their daily activities, and difficulty can be overcome through the use of appropriate and efficient technology.

2.3 Written Works

In terms of written works, students are convinced that multimedia-assisted learning activities enable them to comprehend the lesson with a composite mean of 3.41 and a verbal interpretation of Moderate Extent. The indicator I answer open-ended questions correctly, ranked the highest with a weighted mean of 3.53, and interpreted it as Great Extent. The item I pay close attention to written instructions in essays ranked 2nd with a weighted mean of 2.49, verbally interpreted as Moderate Extent, followed by the statement I evaluate the correctness of my answers in written works which ranked 3rd with a weighted mean of 3.44 and verbally interpreted as Moderate Extent. However, the indicator I find writing essays and reflection papers enjoyable and engaging ranked 8th with a weighted mean of 3.38 and was interpreted as Moderate Extent, followed by the item I achieve better scores in essays and reflection papers, which ranked 9th with a weighted mean of 3.34 and was interpreted as Moderate Extent. Lastly, the indicator I feel more confident in writing essays and

reflection papers, which ranked the lowest with a weighted mean of 3.29 and was interpreted as Moderate Extent.

This shows that multimedia-assisted learning activities contribute to the students' comprehension of the lesson, and may contribute to better results in written works in science.

3. Relationship Between Usefulness and Class Participation

The level of usefulness of multimedia-assisted learning activities in terms of the teaching and learning process showed a low to moderate relationship, implying that it has a significant relationship with assessments, performance tasks, and written works.

Multimedia resources had a low to moderate relationship to the performance task, but a negligible to low correlation to assessments and written works.

Online/Offline Applications had a negligible relationship with performance tasks and written works, and were not a significant factor influencing class participation, with a negligible to low correlation with assessments, but still statistically significant.

4. Challenges Faced in Accessing and Utilizing Multimedia-Assisted Learning Activities

Based on the data gathered, the students faced challenges in the integration of multimedia-assisted learning activities, with a weighted mean of 3.19, verbally interpreted as Agree. The item limited internet connection at school ranked the highest, with a weighted mean of 3.56, interpreted as Strongly Agree. The indicator distraction from other social media and other websites ranked 2nd with a weighted mean of 3.36, verbally interpreted as Agree, followed by the inadequacy of multimedia resources in school, such as computers, tablets, and televisions, which ranked 3rd with a weighted mean of 3.33 and was interpreted as Agree. Meanwhile, the indicator lack of creativity in making multimedia-assisted presentations or projects ranked 8th with a weighted mean of 3.05, interpreted as Agree, followed by sensitivity of the eyes to screen lighting, which ranked 9th with a weighted mean of 3.04, interpreted as Agree. The least encountered challenge was lack of confidence in using digital tools, with a weighted mean of 3.00, and is interpreted as Agree.

This reflects that the challenges are mainly related to resources and connectivity rather than students' ability to use multimedia applications.

Proposed Enrichment Activities in Science

These enrichment activities are designed to integrate multimedia into the learning activities. It may serve as an intervention program or enhancement material in the General Biology Class. These Biology Enrichment Activities are based on the study's findings that students claimed that multimedia- assisted learning activities are useful to a moderate extent in improving their class participation in terms of assessments, performance tasks, and written works, as manifested by the interpretation of Great Extent in performance tasks and Moderate Extent in both assessments and written works.

The proposed enrichment activities are SCI-TECH, AIM, MOBLE-APP, E-MAIL, TRAIN,

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AVAIL-TO, MULTI-SCI, MAP, SIM, LIMITATION, MEDIA, and ASSIST. These proposed enrichment activities aimed at enhancing the class participation of students to improve the results of their assessments, performance tasks, and written works.

Conclusions

In light of the foregoing findings, the following conclusions are drawn.

1. The students found multimedia-assisted learning activities moderately useful in terms of teaching and learning process, multimedia resources, and online/offline applications.
2. The students acknowledged the usefulness of multimedia in improving their class participation to a moderate extent in terms of assessments and written works, while to a great extent with performance tasks.
3. Results indicated a statistically significant positive relationship for the assessments on the teaching and learning process and multimedia resources, while a very weak relationship with online/offline applications when paired with the extent of class participation.
4. Limited internet connection at school, distraction from other social media and other websites, and inadequate multimedia resources served as the most prevalent challenges encountered by students in utilizing multimedia-assisted learning activities.
5. Based on the findings, the proposed enrichment activities are SCI-TECH, AIM, MOBILE-APP, E-MAIL, TRAIN, AVAIL-TO, MULTI-SCI, MAP, SIM, LIMITATION, MEDIA, and ASSIST aimed at improving the class participation of the students.

Recommendations

Based on the collected data, the researcher recommended the following:

1. The proposed enrichment activities may be reviewed and evaluated first before utilization by teachers of Congressional District I. The activities like SCI-TECH, MOBILE-APP, SIM, and others aim to address the moderate usefulness of multimedia-assisted learning activities.
2. Teachers may adopt the proposed enrichment activities that include downloadable applications such as video and picture editors, and other offline applications such as BioQuiz and Learn Biology & Games on Molecular DNA to facilitate learning using multimedia, even if a limited internet connection is experienced.
3. Teachers may develop structured programs that will cater to the needs of students in terms of the use of multimedia by carrying out structured plans of activities that will train students in incorporating multimedia applications in their projects, presentations, and portfolios.
4. Teachers, school administrators, and other stakeholders may use the proposed enrichment activity.
5. Teachers may integrate a variety of multimedia to assist in learning activities in abstract topics, to break them down into simpler, understandable concepts that can avoid information overload and promote retention and mastery of learning competence.

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