Technology-Enhanced Explicit Vocabulary Instruction in Teaching Science 8: Improving Students' Scientific Comprehension and Performance

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Abstract

This study determined the relationship between technology-enhanced explicit vocabulary instruction in teaching science 8: improving scientific comprehension and performance to the grade 8 students of Liceo de Pakil. Specifically, this study answered the following, the level of utilizing technology-enhanced explicit vocabulary instruction, the students' comprehension and the student's performance in written output in formative test and summative test. The study also aimed to determine the significant relationship between the level of utilizing technology-enhanced explicit vocabulary instruction on students' comprehension and performance.

The instruments used in the study was a survey questionnaire checklist and 50-item test. Moreover, the researcher utilized weighted mean, standard deviation and pearson r correlation to analyze and interpret the data gathered. Sixty (60) randomly selected grade 8 students from Liceo de Pakil were assessed and used as respondents of this research.

The findings shows that the level of utilizing technology-enhanced explicit vocabulary instruction was perceived to as very great extent. Similarly, the student comprehension was also perceived as very great extent. Moreover, the student's performance in terms of written output as to formative test showed a descriptive equivalent of satisfactory, and the level of student's performance in terms of written output as to summative test showed a descriptive equivalent of outstanding. Additionally, the research findings highlight the significant relationship between the technology-enhanced explicit vocabulary instruction and student comprehension while it is found to have significant relationship between technology-enhanced explicit vocabulary instruction in students' performance.

Based on the findings, the following conclusions were made. The study revealed no significant relationship between technology-enhanced explicit vocabulary instruction and student comprehension, leading to the acceptance of the hypothesis asserting their lack of significant correlation. A significant relationship between technology-enhanced explicit vocabulary instruction and students' performance was found, thus rejecting the second hypothesis.

It is recommended that students actively engage with study-provided resources and seek teacher support to overcome challenges with scientific vocabulary, while teachers should integrate technology-enhanced instruction into their teaching, supported by ongoing professional development. Schools can enhance curriculum with student-centered vocabulary programs, fostering inclusive learning environments, while future research should explore further avenues for improving vocabulary instruction and comprehension.

Keywords: technology-enhanced; student's performance; vocabulary instruction

1. Introduction

Reading comprehension is an essential interdisciplinary skill that serves as a foundation of all other subject areas. In science, as a subject rich in vocabulary words, the learner's ability to read and comprehend to generate a conceptual understanding cannot be set aside.

Students find it hard to articulate the language of science because of various terminologies that they need to remember and comprehend. Their science academic achievement and participation in class discussions are anchored to their deep understanding of science vocabulary.

In connection with this, vocabulary instruction refers to the different strategies which primarily involve teaching the meaning of an unfamiliar word directly or indirectly. Direct or explicit vocabulary instruction refers to teaching specific words and their meanings intentionally, usually done before the start of the reading session while indirect vocabulary instruction involves students' learning words and their meanings through hearing conversations and independent reading. (Ayodele, 2017).

Moreover, the great deal of unfamiliar terms, domain-specific and non-technical terminologies that the students encounter in science texts and discussions post a major comprehension barrier that affects their ability to generate conceptual understanding in the subject and as well as their ability to successfully participate in the class discussions. Thus, science teachers who are trained as content specialists should integrate literacy strategies such as vocabulary instruction strategies in teaching content areas to address the literacy needs of the learners.

Furthermore, employing literacy strategies in teaching content areas like science is greatly linked to students' ability to attain success in the subject (Ayodele, 2017). Vocabulary instruction for instance as a literacy strategy is a great way of helping students generate conceptual understanding of the topic being discussed which leads to a high level of achievement in the subject.

With this, the researcher wants to conduct research and identify the relationship of between technology-enhanced explicit vocabulary instruction in teaching science 8: improving scientific discourse and performance

1.1 Statement of the Problem

Specifically sought to answer the following questions:

1. What is the level of utilizing technology- enhanced explicit vocabulary instruction in terms of;
   - 1.1 Word connection;
   - 1.2 Word significance;
   - 1.3 Context-Clues;
   - 1.4 Word -rich environment;
   - 1.5 Multiple exposure; and
   - 1.6 Front Load Vocabulary?
2. What is the level of student comprehension in terms of
   - 2.1 Concept Understanding;
   - 2.2 Knowledge Retention;
   - 2.3 Knowledge Acquisition;
   - 2.4 Word Remembering; and
   - 2.5 Logical Reasoning?
3. What is the level of student's performance in written output in terms of
   - 3.1 Formative Test
   - 3.2 Summative Test
4. Is there a significant relationship between the level of utilizing technology-enhanced explicit vocabulary instruction on student comprehension?

5. Is there a significant relationship between the level of technology-enhanced explicit vocabulary instruction in students' performance?

2. Methodology

This study will use the Descriptive Quantitative research method in gathering information. This method enables the researcher to interpret the theoretical meaning of the findings and hypothesis development for further studies. Specifically, the researcher stylized a questionnaire type of descriptive quantitative research method, the Likert scale to be specific, which enables researcher to gather information from the respondents without the respondents having any difficulties in answering the questions required for the researcher to have information regarding the relationship between technology-enhanced explicit vocabulary instruction in teaching science 8: improving students scientific comprehension and performance.

3. Results and Discussion

This chapter enumerates the different results and discusses the results that were yielded from the treatment of the data that was gathered in this study. The following tabular presentations and discussions will further characterize the relationship between technology-enhanced explicit vocabulary instruction in teaching science 8: improving students' scientific comprehension and performance.

The following tables shows presentation, analysis, and interpretation of data concerning the level of utilization of technology in enhancing explicit vocabulary instruction in word connection, word significance, context clues,word-rich environment, multiple exposure, and front load vocabulary. The level of student comprehension. It analyzes students' conceptual understanding, their ability to retain knowledge, the efficiency of knowledge acquisition, their capacity for remembering new words, and their logical reasoning skills. And the impact of technology-enhanced explicit vocabulary instruction on students' performance in written output. This encompasses evaluating their performance in both formative and summative assessments. Lastly, the existence of the significant relationship between the level of utilizing technology-enhanced explicit vocabulary instruction and student comprehension, as well as its correlation with students' overall performance.

Table 1. Level of utilizing technology-enhanced explicit vocabulary instruction in terms of Word connection

STATEMENTS	MEAN	SD	REMARKS
Provide activities which enable the students to connect each word from another.	4.48	0.60	Strongly Agree
Create word associations among the different terms.	4.52	0.62	Strongly Agree
Focus on practical terms and words that can easily understand by the students.	4.53	0.57	Strongly Agree
Allow the students to identify words that share meanings.	4.58	0.59	Strongly Agree
Integrate new words from the instruction and allow students to relate it with their knowledge.	4.55	0.62	Strongly Agree
Weighted Mean	*4.53*		
SD	*0.40*		
Verbal Interpretation	*Very Great Extent*		

Table 1 illustrates the level of utilizing technology-enhanced explicit vocabulary instruction in terms

of word connection. The students strongly agree in the utilization of technology-enchanced explicit vocabulary instruction. They find it beneficial in for identifying words with shared meaning(M=4.58, SD=0.59), and for familiarizing activities help them connect words together (M= 4.48, SD= 0.60)

The level of technology- enhanced explicit vocabulary instruction in terms of Word connection attained a weighted mean score of 4.53 and a standard deviation of 0.40 and was Very Great Extent among the respondents.

The results highlight the effectiveness and preference for incorporating activities that allow students to identify words with shared meanings and connect words to one another in technology-enhanced explicit vocabulary instruction, as indicated by the high mean scores and strong agreement among respondents.

Table 2. Level of utilizing technology- enhanced explicit vocabulary instruction in terms of Word significance

STATEMENTS	MEAN	SD	REMARKS
Let the students revise their vocabulary.	4.72	0.45	Strongly Agree
Allow the learners to learn from the context of the words.	4.77	0.43	Strongly Agree
Improves all the areas of communication through reading, writing and listening from the new words.	4.65	0.52	Strongly Agree
Distribute representations of words as real-valued vectors for communication.	4.55	0.57	Strongly Agree
Extract meaning from the low-dimension words so that students can relate another vocabulary on it.	4.63	0.49	Strongly Agree
Weighted Mean	*4.66*		
SD	*0.23*		
Verbal Interpretation	*Very Great Extent*		

Table 2 illustrate the level of utilizing technology-enhanced explicit vocabulary instruction in terms of word connection. The learners strongly agree that it allows to learn from the context of the word (M= 4.77,SD= 0.43) and for extracting the meaning of low-dimension words to create another vocabulary (M=4.63, SD=0.49). Even the representation of words as a real-valued vectors for communication got the lowest mean 4.55 but it still have a verbal interpretation of strongly agree.

The weighted mean of 4.66 further reinforces the overall agreement with these statements, indicating that these strategies are embraced to a very great extent within the educational context. These findings highlight the importance of incorporating these effective vocabulary learning strategies into educational practices to enhance language acquisition and communication skills.

Table 3. Level of utilizing technology- enhanced explicit vocabulary instruction in terms of Context-Clues

STATEMENTS	MEAN	SD	REMARKS
Provide hints from the sentence and let the students identify the meaning from it.	4.68	0.50	Strongly Agree
Integrate clues on the passage which help them understand the meanings of new or unfamiliar words	4.80	0.40	Strongly Agree
Restate information in a way that the students will learn the meaning of the new words.	4.78	0.42	Strongly Agree
Use the meaning of other words in a picture on the page to help them learn the meaning of the unknown	4.75	0.44	Strongly Agree

word.			
Provide instructions that focus on the key phrases or ideas in a sentence and deduce the main idea of a sentence or paragraph based on this information.	4.63	0.55	Strongly Agree
Weighted Mean	*4.73*		
SD	*0.33*		
Verbal Interpretation	*Very Great Extent*		

Table 3 illustrates the level of utilizing technology- enhanced explicit vocabulary instruction interms of context clues. The students strongly agree that in utilizing technology they can integrate clues on the passage that help them understande the meaning of unfamiliar words (M=4.80, SD= 0.40) and they can provide intsructions that focus on the key phrases in a sentence and deduce the main idea of a sentence or paragraph based on the information given (M= 4.63,SD= 0.55) established the lowest mean score of responses yet was remarked Strongly Agree.

The findings highlight that integrating context-clues help the students in developing their vocabularies skills in formulating new words.

Table 4. Level of utilizing technology- enhanced explicit vocabulary instruction in terms of Word-rich environment

STATEMENTS	MEAN	SD	REMARKS
Use music, songs, and/or poetry in integrating new words.	4.68	0.54	Strongly Agree
Use open-ended resources to support language development.	4.60	0.59	Strongly Agree
Engage the student repetitively in various ways of integrating new words.	4.57	0.53	Strongly Agree
Create meaningful language in context to have an authentic reason for reading and writing.	4.73	0.45	Strongly Agree
Including literacy materials in the dress-ups and encourage documentation among the learners.	4.58	0.59	Strongly Agree
Weighted Mean	*4.63*		
SD	*0.29*		
Verbal Interpretation	*Very Great Extent*		

Table 4 illustrate the level of utilizing technology-enhanced explicit vocabulary instruction in terms of word-rich environment. Students strongly agree that creating meaningful language in context to have an authentic reasoning for reading and writing borne the highest mean score (M=4.73, SD=0.45) On the other hand, Engaging the student repetitively in various ways of integrating new words customary the lowest mean score of responses with (M=4.57, SD=0.53) yet was remarked Strongly Agree.

The findings highlight students' positive perceptions regarding the utilization of technology to create a word-rich environment in explicit vocabulary instruction. They emphasize the significance of contextualized learning and repetitive engagement as effective strategies for vocabulary acquisition, underscoring the potential of technology to enhance language learning experiences.

Table 5. Level of utilizing technology- enhanced explicit vocabulary instruction in terms of Multiple exposure

STATEMENTS	MEAN	SD	REMARKS
Expose the students in deliberate language environment.	4.60	0.53	Strongly Agree
Utilize various types of language integration.	4.73	0.45	Strongly Agree
Engage students into different activities that uses conversation and word processing activities.	4.70	0.50	Strongly Agree
Supports student's natural linguistic development by providing them with opportunities for language learning and challenges.	4.68	0.50	Strongly Agree
Gives students numerous opportunities and ways to interact with information and learning.	4.73	0.45	Strongly Agree
Weighted Mean	*4.69*		
SD	*0.30*		
Verbal Interpretation	*Very Great Extent*		

Table 5 proves the level of utilizing technology- enhanced explicit vocabulary instruction in terms of Multiple exposure. Students strongly agree that utilization of various types of language integration generated the highest mean score (M=4.73, SD=0.45). On the other hand, Exposing the students in deliberate language environment acknowledged the lowest mean score of responses with (M=4.60, SD=0.53) yet was remarked Strongly Agree.

The level of technology- enhanced explicit vocabulary instruction in terms of Multiple exposure conquered a weighted mean score of 4.69 and a standard deviation of 0.30 and was Very Great Extent among the respondents.

The findings incorporate various types of language integration techniques that are highly valued in enhancing vocabulary instruction with technology, even though deliberate exposure to language environments also received strong agreement.

Table 6. Level of utilizing technology- enhanced explicit vocabulary instruction in terms of Front Load Vocabulary

STATEMENTS	MEAN	SD	REMARKS
Introduced to the vocabulary related to the text or passage before going to comprehend the texts.	4.68	0.54	Strongly Agree
Provide specific word instruction geared toward increased comprehension and vocabulary.	4.77	0.46	Strongly Agree
Lead wordplay activities that build upon previously learned words.	4.58	0.53	Strongly Agree
Encourage students to read often to boost their word knowledge and language development.	4.73	0.45	Strongly Agree
Punctuate the key learning points before an activity or experience takes place, rather than or in combination with, debriefing it afterwards.	4.65	0.48	Strongly Agree
Weighted Mean	*4.68*		
SD	*0.25*		
Verbal Interpretation	*Very Great Extent*		

Table 6 explains the level of technology-enhanced explicit vocabulary instruction in terms of Front Load Vocabulary. The data reveals a strong consensus among students regarding the importance of specific word instruction aimed at enhancing comprehension and vocabulary. This aspect garnered the highest mean

score of 4.77, indicating a robust agreement among respondents. Students strongly endorse the value of targeted word instruction, recognizing its efficacy in deepening their understanding and expanding their vocabulary. Conversely, the practice of leading wordplay activities that build upon previously learned words received a slightly lower mean score of 4.58. Despite this, it is noteworthy that the response still fell within the "Strongly Agree" category. This indicates that while there is slightly less agreement compared to other aspects, students still acknowledge the benefits of engaging in wordplay activities to reinforce and extend their vocabulary skills.

The findings underscore students' positive attitudes towards both specific word instruction and wordplay activities as effective strategies for vocabulary enhancement. They highlight the importance of tailored instruction and interactive learning experiences in facilitating language development and comprehension. These results underscore the significance of incorporating diverse instructional approaches to meet the varied needs of students and promote comprehensive vocabulary acquisition.

Table 7. Level of student comprehension in terms of Concept Understanding

STATEMENTS	MEAN	SD	REMARKS
Seek personal challenges to deepen own understanding regarding the concept.	4.73	0.48	Strongly Agree
Engage in rigorous peer review processes and understand input from diverse perspectives.	4.78	0.45	Strongly Agree
Think accurately based on facts and are free from bias.	4.75	0.54	Strongly Agree
Discuss concepts and explore new knowledge to deeply understand concepts.	4.70	0.50	Strongly Agree
Consider all the available information and use it to maximize the understanding for each concept.	4.63	0.61	Strongly Agree
Weighted Mean	*4.72*		
SD	*0.36*		
Verbal Interpretation	*Very Great Extent*		

Table 7 illustrates the level of student comprehension in terms of Concept Understanding. The data reveals a strong agreement among respondents regarding the significance of engaging in rigorous peer review processes and understanding input from diverse perspectives. This aspect garnered the highest mean score of 4.78. Students strongly endorse the value of peer review processes, recognizing their role in fostering critical thinking and broadening their understanding through exposure to diverse viewpoints.

The level of student comprehension in terms of Concept Understanding attained a weighted mean score of 4.72 and a standard deviation of 0.36 and was Very Great Extent among the respondents.

These results underscore the importance of engaging in rigorous peer review processes and considering diverse perspectives in enhancing student comprehension of concepts. While the utilization of all available information received a slightly lower score, it still contributed significantly to student understanding. Overall, the findings emphasize the effectiveness of these approaches in fostering a deep understanding of concepts among students.

Table 8. Level of student comprehension in terms of Knowledge Retention

STATEMENTS	MEAN	SD	REMARKS
Learn to focus in multiple ways of learning.	4.57	0.56	Strongly Agree
Utilize Previous Learning to Promote New Learning.	4.63	0.61	Strongly Agree

Gain practical experiences from every situation that may encounter.	4.57	0.56	Strongly Agree
Interact and engage with the various kinds of activities that can help increasing the retention of knowledge.	4.60	0.53	Strongly Agree
Apply learning to a real word and ensure that the knowledge and its concept will retain.	4.55	0.57	Strongly Agree
Weighted Mean	*4.58*		
SD	*0.34*		
Verbal Interpretation	*Very Great Extent*		

Table 8 exemplifies the level of student comprehension in terms of Knowledge Retention. The respondents strongly agree regarding the importance of utilizing previous learning to promote new learning. This aspect received the highest mean score of 4.63, reflecting a robust agreement among participants. Students strongly endorse the practice of leveraging prior knowledge as a foundation for acquiring new concepts and skills, recognizing its value in facilitating deeper understanding and retention. Conversely, the statement regarding applying learning to real-world contexts to ensure knowledge retention received a slightly lower mean score of 4.55. Despite this, it is worth noting that the response still fell within the "Strongly Agree".

The level of student comprehension in terms of Knowledge Retention reached a weighted mean score of 4.58 and a standard deviation of 0.34 and was Very Great Extent among the respondents.

These results emphasize the importance of utilizing previous learning to facilitate new learning experiences in enhancing knowledge retention among students. While applying learning to real-world contexts received a slightly lower score, it still played a significant role in promoting knowledge retention. Overall, the findings underscore the effectiveness of these approaches in fostering long-term retention of knowledge among students.

Table 9. Level of student comprehension in terms of Knowledge Acquisition

STATEMENTS	MEAN	SD	REMARKS
Construct paragraph in chronological order.	4.52	0.60	Strongly Agree
Learn how to compare and contrast ideas.	4.58	0.62	Strongly Agree
Understand the order of importance of each concept.	4.53	0.57	Strongly Agree
Demonstrate a willingness to continuously improve learning processes.	4.63	0.61	Strongly Agree
Develop internal and external communication channels while learning science.	4.65	0.52	Strongly Agree
Weighted Mean	*4.58*		
SD	*0.31*		
Verbal Interpretation	*Very Great Extent*		

Table 9 demonstrates the level of student comprehension in terms of Knowledge Acquisition. The respondents strongly agree with regards to the importance of developing both internal and external communication channels while learning science. This aspect garnered the highest mean score of 4.65, indicating a robust agreement among participants. Students strongly endorse the notion that fostering effective communication channels, both within themselves and with external sources, is crucial for comprehensively grasping scientific concepts and engaging in collaborative learning environments. Conversely, the statement regarding constructing paragraphs in chronological order received a slightly lower mean score of 4.52. Despite this, it is noteworthy that the response still fell within the "Strongly Agree".

The level of student comprehension in terms of Knowledge Acquisition achieved a weighted mean score of 4.58 and a standard deviation of 0.31 and was Very Great Extent among the respondents.

The findings underscore students' positive attitudes towards both internal and external communication development and paragraph construction strategies in science learning. They highlight the significance of cultivating effective communication skills and organizing information coherently to enhance comprehension and articulation of scientific concepts. These results emphasize the importance of fostering holistic communication competencies to facilitate meaningful engagement and collaboration within the science learning context.

Table 10. Level of student comprehension in terms of Word Remembering

STATEMENTS	MEAN	SD	REMARKS
Interpret and understand words and other scientific terms.	4.63	0.52	Strongly Agree
Appropriately identify information from charts, graphs and maps.	4.58	0.53	Strongly Agree
Find meaning behind the pictures, infographics and data from different resources.	4.67	0.54	Strongly Agree
Translate information from different aspects in the learning materials up to more precise verbal explanation.	4.63	0.49	Strongly Agree
Recognize the importance of words and understanding its meaning on the development of deep practical experiences.	4.75	0.47	Strongly Agree
Weighted Mean	*4.65*		
SD	*0.21*		
Verbal Interpretation	*Very Great Extent*		

Table 10 shows the level of student comprehension in terms of Word Remembering. The data indicates that students strongly agree in regarding the significance of recognizing the importance of words and understanding their meaning in the development of deep practical experiences. This aspect received the highest mean score of 4.75. Students strongly endorse that a thorough understanding of vocabulary is essential for cultivating meaningful and immersive learning experiences, recognizing its pivotal role in comprehension and application. Conversely, the statement regarding appropriately identifying information from charts, graphs, and maps received a slightly lower mean score of 4.58. Despite this, it is worth noting that the response still fell within the "Strongly Agree" category.

The level of student comprehension in terms of Word Remembering accomplished a weighted mean score of 4.65 and a standard deviation of 0.21 and was Very Great Extent among the respondents.

These results emphasize the importance of recognizing the significance of words and understanding their meanings in the context of developing deep practical experiences in fostering word remembering among students. While appropriately identifying information from charts, graphs, and maps received a slightly lower score, it still played a significant role in promoting word remembering. Overall, the findings underscore the effectiveness of these approaches in enhancing word remembering among students, particularly in practical contexts.

Table 11. Level of student comprehension in terms of Logical Reasoning

STATEMENTS	MEAN	SD	REMARKS

Practice conditional statements and filter out biases.	4.58	0.62	Strongly Agree
Monitor own thinking for logical fallacies and anticipate the outcome for own decisions.	4.55	0.57	Strongly Agree
Focuses on direct imparting explicit sentence construction strategies.	4.68	0.50	Strongly Agree
Use a parallel structure for connected ideas.	4.60	0.56	Strongly Agree
Identify the most efficient means of generating consistent and optimum results.	4.72	0.45	Strongly Agree
Weighted Mean	*4.63*		
SD	*0.23*		
Verbal Interpretation	*Very Great Extent*		

Table 11 proves the level of student comprehension in terms of Logical Reasoning. The respondents strongly agree regarding the importance of identifying the most efficient means of generating consistent and optimum results. This aspect received the highest mean score of 4.72, indicating a robust agreement among participants. Students strongly endorse the notion that understanding and implementing efficient strategies are vital for achieving consistent and optimal outcomes across various endeavors. Conversely, the statement regarding monitoring one's thinking for logical fallacies and anticipating the outcome for personal decisions received a slightly lower mean score of 4.55. However, it is important to note that the response still fell within the "Strongly Agree"

The level of student comprehension in terms of Logical Reasoning conquered a weighted mean score of 4.63 and a standard deviation of 0.23 and was Very Great Extent among the respondents.

This findings results that students demonstrate a commendable grasp of logical reasoning concepts, as evidenced by their ability to identify efficient problem-solving methods and critically evaluate their own thinking processes for logical coherence.

Table 12. Level of student's performance in terms of Written Output as to formative test.

Score	f	%	Descriptive Equivalent
41 - 50	0	*0.00*	Outstanding
31 - 40	15	*25.00*	Very Satisfactory
21 - 30	40	*66.67*	Satisfactory
11 - 20	5	*8.33*	Fairly Satisfactory
0 - 10	0	*0.00*	Did not meet Expectation
Total	60	100	
Weighted Mean	28.33		
SD			
Verbal Interpretation	4.62		
	Satisfactory		

Table 12 presents the level of student's performance in terms of Written Output as formative test. Out of total number of sixty respondents *"21 to 30*" received the highest frequency of forty (40) or 66.67% of the total population with descriptive equivalent of *Satisfactory*. While the scores *"11 to 20*" received the lowest frequency of five (5) or 8.33% of the total population with descriptive equivalent of *Fairly Satisfactory*.

With a *(Weighted Mean = 28.33, SD = 4.62)* it shows that the level of student's performance in terms of Written Output as to formative test has a descriptive equivalent of *Satisfactory*.

The findings indicate that while there is variation in individual performance, the majority of students performed satisfactorily in terms of their written output on the pre-test assessment. This highlights a baseline level of competency among the student population, laying a foundation for further improvement and development in written communication skills.

Table 13. Level of student's performance in terms of Written Output as summative test

Score	f	%	Descriptive Equivalent
41 - 50	51	*85.00*	Outstanding
31 - 40	8	*13.33*	Very Satisfactory
21 - 30	1	*1.67*	Satisfactory
11 - 20	0	*0.00*	Fairly Satisfactory
0 - 10	0	*0.00*	Did not meet Expectation
Total	60	100	
Weighted Mean	46.08		
SD			
Verbal Interpretation	4.22		
	Outstanding		

Table 13 grants the level of student's performance in terms of Written Output as summative. Out of total number of sixty respondents "41 to 50" received the highest frequency of fifty-one (51) or 85.00% of the total population with descriptive equivalent of Outstanding. While the scores "21 to 30" received the lowest frequency of one (1) or 1.67% of the total population with descriptive equivalent of Satisfactory.

With a *(Weighted Mean = 46.08, SD = 4.22)* it shows that the level of student's performance in terms of Written Output as to summative test has a descriptive equivalent of *Outstanding*.

The findings indicate a remarkable improvement in student performance in terms of written output from the pre-test to the post-test assessment. The majority of students achieved outstanding results, demonstrating substantial growth and proficiency in their written communication skills. This suggests effective teaching and learning strategies were employed, resulting in enhanced student outcomes in written expression.

Table 14 Significant relationship between the technology-enhanced explicit vocabulary instruction and student comprehension

		Concept Understanding	Knowledge Retention	Knowledge Acquisition	Word Remembering	Logical Reasoning
Word connection	Pearson Correlation	0.165	0.251	0.231	-0.263	-0.105
	Sig. (2-tailed)	0.005	0.4	0.39	0.069	0.141
	N	59	59	59	59	59
	Strength	*Very Weak*	Weak	Weak	Very Weak	Very Weak

	Analysis	*Significant*	*NS*	*NS*	*NS*	*NS*
Word significance	Pearson Correlation	-0.011	-0.204	0.13	-0.212	0.032
	Sig. (2-tailed)	0.316	0.169	0.09	0.822	0.378
	N	59	59	59	59	59
	Strength	*Very Weak*	*Very Weak*	*Very Weak*	*Very Weak*	*Very Weak*
	Analysis	*NS*	*NS*	*NS*	*NS*	*NS*
Context-Clues	Pearson Correlation	-0.115	-0.078	0.049	0.155	0.07
	Sig. (2-tailed)	0.882	0.023	0.012	0.105	0.043
	N	59	59	59	59	59
	Strength	*Very Weak*	*Very Weak*	*Very Weak*	*Very Weak*	*Very Weak*
	Analysis	*NS*	*Significant*	*Significant*	*NS*	*NS*
Word -rich environment	Pearson Correlation	0.051	-0.05	-0.024	-0.052	-0.095
	Sig. (2-tailed)	0.145	0.398	0.368	0.673	0.894
	N	59	59	59	59	59
	Strength	*Very Weak*	*Very Weak*	*Very Weak*	*Very Weak*	*Very Weak*
	Analysis	*NS*	*NS*	*NS*	*NS*	*NS*
Multiple exposure	Pearson Correlation	0.036	-0.132	0.009	-0.132	0.269
	Sig. (2-tailed)	0.62	0.091	0.059	0.468	0.138
	N	99	99	99	99	99
	Strength	*Very Weak*	*Very Weak*	*Very Weak*	*Very Weak*	Weak
	Analysis	*NS*	*NS*	*NS*	*NS*	*NS*
Front Load Vocabulary	Pearson Correlation	0.015	-0.206	-0.095	-0.009	-0.133
	Sig. (2-tailed)	0.522	0.098	0.067	0.483	0.231
	N	59	59	59	59	59
	Strength	*Very Weak*	*Very Weak*	*Very Weak*	*Very Weak*	Very Weak
	Analysis	*NS*	*NS*	*NS*	*NS*	*NS*

Scale	**Strength**
0.80 – 1.00	Very Strong
0.60 – 0.79	Strong
0.40 – 0.59	Moderate
0.20 – 0.39	Weak
0.00 – 0.19	Very Weak

Table 14 presents the significant relationship between the technology-enhanced explicit vocabulary instruction and student comprehension

The *Word connection, Word significance, Context-Clues, Word -rich environment, Multiple exposure*

and Front Load Vocabulary of the technology-enhanced explicit vocabulary instruction was observed to have no significant relationship to the student comprehension. This is based on the computed r values obtained from the tests. Furthermore, the p-values obtained were greater than the significance alpha 0.05, hence there is no significance.

From the findings above, we can infer that at 0.05 level of significance, the null hypothesis "*There is no significant relationship between the technology-enhanced explicit vocabulary instruction and student comprehension*" is accepted which incites that there is a significant relationship between them.

This suggests that based on the data analyzed, there is no statistically significant relationship between technology-enhanced explicit vocabulary instruction and student comprehension.

Table 15. Significant relationship between the technology-enhanced explicit vocabulary instruction in students written performance

		written performance/summative test
Word connection	Pearson Correlation	0.005
	Sig. (2-tailed)	0.000
	N	59
	Strength	*Very Weak*
	Analysis	*Significant*
Word significance	Pearson Correlation	-0.169
	Sig. (2-tailed)	0.000
	N	59
	Strength	*Very Weak*
	Analysis	*Significant*
Context-Clues	Pearson Correlation	-0.076
	Sig. (2-tailed)	0.000
	N	59
	Strength	*Very Weak*
	Analysis	*Significant*
Word -rich environment	Pearson Correlation	0.089
	Sig. (2-tailed)	0.000
	N	59
	Strength	*Very Weak*
	Analysis	*Significant*
Multiple exposure	Pearson Correlation	0.162
	Sig. (2-tailed)	0.000
	N	59
	Strength	*Very Weak*
	Analysis	*Significant*
Front Load Vocabulary	Pearson Correlation	0.105
	Sig. (2-tailed)	0.000
	N	59
	Strength	*Very Weak*
	Analysis	*Significant*

Scale	**Strength**
0.80 – 1.00	Very Strong

0.60 – 0.79	Strong
0.40 – 0.59	Moderate
0.20 – 0.39	Weak
0.00 – 0.19	Very Weak

Table 15 presents the significant relationship between the technology-enhanced explicit vocabulary instruction in students written performance

The Word connection, Word significance, Context-Clues, Word -rich environment, Multiple exposure and Front Load Vocabulary of the technology-enhanced explicit vocabulary instruction was observed to have significant relationship to the student written performance. This is based on the computed r values obtained from the tests with very weak relationship. Furthermore, the p-values obtained were less than the significance, hence there is a significance.

From the findings above, we can infer that at 0.05 level of significance, the null hypothesis "*There is no significant relationship between the technology-enhanced explicit vocabulary instruction in students written performance*" is rejected. Thus, the alternative should be accepted which incites that there is a significant relationship between them.

It is evident that there is a significant relationship between the components of technology-enhanced explicit vocabulary instruction (Word connection, Word significance, Context-Clues, Word-rich environment, Multiple exposure, and Front Load Vocabulary) and student written performance.

4. Conclusion and Recommendation

On the basis of the foregoing findings, the following conclusion was drawn.

The study shows the relationship between the technology-enhanced explicit vocabulary instruction and student comprehension has no significant Thus, the researcher therefore concludes that the research hypotheses stating that There is no significant relationship between the technology-enhanced explicit vocabulary instruction and student comprehension is accepted.

The second hypothesis result relationship between the technology-enhanced explicit vocabulary instruction in students written performance has significant Thus, the researcher therefore concludes that the research hypotheses stating that There is no significant relationship between the technology-enhanced explicit vocabulary instruction in students written performance is rejected. Thus, the alternative should be accepted which incites that there is a significant relationship between them.

Based on the drawn conclusions resulted to the following recommendations:

1. It is recommended that students actively engage with the resources and strategies provided in the study to address their challenges with scientific vocabularies. By seeking support from teachers and utilizing available tools, students can enhance their understanding and performance in scientific discourse.
2. Teachers are encouraged to integrate technology-enhanced explicit vocabulary instruction into their teaching practices, leveraging innovative methodologies to promote active learning and comprehension among students. Additionally, ongoing professional development opportunities can further empower teachers to effectively implement these strategies in their classrooms.
3. Schools should consider implementing curriculum enhancements and enrichment programs focused on vocabulary development and comprehension improvement. By prioritizing student-centered approaches and providing tailored support, schools can create inclusive learning environments that cater to the diverse needs of students.

References:

Ayodele, M. O. (2017). Influence of vocabulary development on reading comprehension of secondary school students in science. European Journal of Education Studies, 3(3), 81-90. http://dx.doi.org/10.46827/ejes.v0i0.506