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Interactive Multimedia Tools in Reading Comprehension of Learners

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ABSTRACT

This study examines the use of interactive multimedia tools to enhance students' reading comprehension during the 2024-2025 school year. A total of 250 elementary school teachers from the Antipas District, Magpet West District, Matalam West District, Matalam Central District, President Roxas South District, and President Roxas Central District in Cotabato Province were selected as respondents using purposive and complete enumeration sampling methods. To analyze the effectiveness of multimedia tools, the study employed mean and weighted mean calculations, alongside Pearson correlation coefficient and multiple linear regression analysis for hypothesis testing. Findings indicate a significant relationship between interactive multimedia tools and learners' reading comprehension, particularly in terms of engagement level, content understanding, and ease of use. Based on the results, it is recommended that teachers integrate adaptive learning features in multimedia tools to better address individual learners' needs. Additionally, incorporating gamification elements such as quizzes, rewards, and interactive storytelling can enhance student interactivity. Continuous professional development focused on interactive multimedia strategies is encouraged to further support reading comprehension development among learners.

Keywords: Gamification, Interactive Multimedia Tools, Students' Reading Comprehension

INTRODUCTION

Reading comprehension challenges are widespread among students globally, and I believe several factors contribute to this, including socio-economic status, language barriers, and access to quality educational resources. I've observed that students in low-income countries often encounter even greater difficulties, as their access to quality education and learning materials is limited. These constraints make it much harder for them to develop strong reading skills, which are essential for academic success.

Moreover, Smith and Rodriguez (2023) stated that students from lower socio-economic status backgrounds often have less exposure to books and early literacy experiences, which can hinder their ability to comprehend texts effectively.

Hence, Li and Anderson (2023) reported that language and cultural differences also contribute significantly to the global reading comprehension problem. Students learning in a second language often struggle with understanding texts due to limited vocabulary and unfamiliarity with cultural contexts embedded in the reading materials. As with the rise of digital media, students are increasingly engaging with texts in fragmented ways, which has been shown to impair deep reading and comprehension skills (Williams & Harris, 2023).

Furthermore, effective reading comprehension is heavily dependent on the quality of instruction. Recent studies have underscored the importance of professional development for teachers, focusing on strategies that promote active reading, critical thinking, and engagement with texts. The literature also suggests that ongoing support for teachers can lead to significant improvements in student outcomes (Johnson & Brown, 2023).

Additionally, the rise of digital media has influenced students' reading habits. While access to online resources has increased, there is a concern that students are more engaged in superficial reading rather than deep comprehension. The shift from traditional reading to screen-based reading can impact the development of critical reading skills (Luz & Perez, 2023).

Despite the growing integration of interactive multimedia tools in educational settings, there remains a significant research gap in understanding their specific impact on enhancing reading comprehension among students. While numerous studies have explored the general benefits of multimedia learning, limited research has focused on how these tools directly affect the comprehension skills of students across different grade levels and learning contexts (Nguyen & Lee, 2023).

Moreover, much of the existing literature tends to concentrate on the technical aspects of multimedia tools or their application in broader learning environments rather than honing in on reading comprehension. Additionally, the difference in student achievement between high and low income children growing the poverty gap is lack of longitudinal studies that assess the long-term effects of interactive multimedia on reading comprehension, particularly in comparison to traditional learning methods. The rapid advancement of technology also means that many of the studies that do exist are already outdated, failing to account for the latest innovations in multimedia tools that could potentially offer more sophisticated and effective approaches to enhancing reading comprehension (Jones & Smith, 2023).

Thus, there is a pressing need for up-to-date research that not only evaluates the effectiveness of current interactive multimedia tools but also considers the diverse needs of students in varying educational contexts.

METHODOLOGY

Research Design

This study examined the relationship between students' reading comprehension and multimedia resources using a descriptive correlational design. A sample of pupils from various schools who got multimedia tools have their data collected. Data on the students' reading comprehension abilities both before and after the intervention were gathered for the study via a survey questionnaire.

This study utilized a researcher-made questionnaire about the perception of teachers on face-to-face and modular learning approach duly validated by experts. The questionnaire consists of options or choices of which the possible experiences are described.

Locale of the Study

This study were conducted in selected DepEd Elementary Schools of Antipas District, Magpet West District, Matalam West District, Matalam Central District, President Roxas South and Central District.

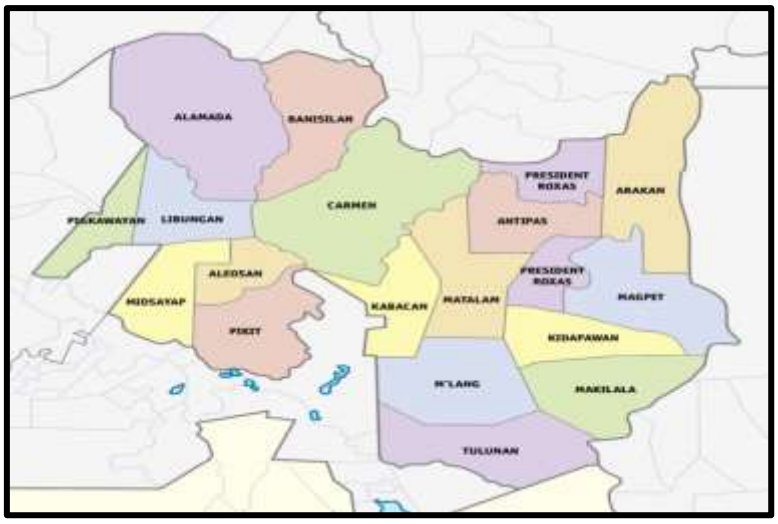

Figure 2. Map of North Cotabato
(https://commons.wikimedia.org/wiki/File:Ph_fil_north_cotabato.png)

Respondents of the Study

The respondents of the study were the 250 teachers of the selected schools in Antipas District, Magpet West District, Matalam West District, Matalam Central District, President Roxas South and Central Districts.

Data Distribution of the Respondents of the Study

Name of School	No. of Teachers/Respondents
1. Antipas Central Elementary School	44
2. Apostol Memorial Central Elementary School	41
3. Don. Concordia B. Jayme Elementary School	36
4. Linao Central Elementary School	19
5. Matalam Central Elementary School	40
6. Malatab Elementary School	22
7. President Roxas Central Elementary School	48
Total	**250**

Sampling Procedure

This study used complete enumeration to get the target respondents for the study, given that the study's subject were teachers from Antipas District, Magpet West District, Matalam West District, Matalam Central District, President Roxas South and Central Districts of Cotabato Province.

A purposive sample strategy called complete enumeration allows the researchers to examine every member of the population who possesses a specific set of characteristics. Units in sampling are the items that make up the population. When complete enumeration sampling is performed, these units are almost probably going to be human.

Research Instruments

The study employed a researcher-structured survey questionnaire drawn from a variety of sources, incl-

uding publications, relevant studies, and the Internet. Alwin (2007) revealed a self-administered questionnaire is a structured form that contains both closed and open-ended questions. It's called self-administered since respondents complete it without the assistance of an interviewer. The questionnaire underwent a reliability test and received an alpha value of 0.843, which was certified by experts in the field. Pilot testing was delivered to 10% of the study's respondents. The questionnaire consisted of two parts:

Part I. The level of the multimedia tools using the 5-point Likert scale as the basis for rating and it is presented below for references.

Liker Scale on the Level of interactive multimedia tools

Level	***Range***	***Description***	***Descriptive Interpretation***
5	4.21 – 5.00	Always	The respondent strongly agrees the item described is very high from 81%-100% level.
4	3.41 – 4.20	Often Times	The respondent agrees that the item described is high from 61%-80% level.
3	2.61 – 3.40	Sometimes	The respondent moderately agrees on the item described moderately from 41%-60% level.
2	1.81 – 2.60	Rare	The respondent disagrees with the item described as low from 21%-40% level.
1	1.00 – 1.80	Very rare	The respondent strongly disagreed with the item described as very low.

Likert Scale on Reading Comprehension

Level	**Range**	**Description**	**Descriptive Interpretation**
5	4.21 – 5.00	Very High	The indicator is rated within the range of
4	3.41 – 4.20	High	The indicator is rated within the range of
3	2.61 – 3.40	Moderate	The indicator is rated within the range of
2	1.81 – 2.60	Low	The indicator is rated within the range of
1	1.00 – 1.80	Very Low	The indicator is rated within the range of

Data Gathering Procedure

The following procedures were followed during the conduct of the study:

Validation. The researchers prepared the survey questionnaire and the interview guide questions that were used in this study. They submitted to the experts in the field for validation.

Permission. After the validation of the research instruments, a letter of approval to conduct the study was obtained. Upon approval, the researchers used the forms for data collection. as recommended in the convergent parallel mixed method design.

Statistical Analysis

The following statistical tests were utilized in data interpretation and analysis.

Frequency Count, percentage, and Weighted Mean were the basis to assess the level of the multimedia tools on the reading comprehension of students. Average is a calculation that takes into account the vary

varying degrees of importance of the numbers in a data set.
Spearman Rho was used in the determination of the relationship between the multimedia tools on the reading comprehension of students.
Multiple Linear Regression Analysis was used in the assessment of the influence of the level of multimedia tools to the reading comprehension of students.

RESULTS AND DISCUSSIONS

This chapter deals with the presentation, analysis and interpretation of data gathered and the discussion of statistical findings of the study.

Interactive Multimedia Tools

The first part focused on the level of interactive multimedia tools (such as PowerPoint and Google Slides and Educational Videos and YouTube) in terms of engagement levels, content understanding, interactivity and ease of use.

Engagement Level

Table 1 indicates interactive multimedia tools in terms of engagement level with a total weighted mean of **4.05**, rated **effective**. They found the interactive features of the multimedia tools engaging, they feel more involved in the learning process when using Interactive Multimedia Tools, actively participate in learning activities when using Interactive Multimedia Tools and feel more motivated to learn when using Interactive Multimedia Tools. The interactive elements encourage them to engage more deeply with reading material. The multimedia tools help them stay engaged with the reading material from start to finish.
This implies that interactive multimedia tools play a crucial role in promoting active learning and student motivation. Interactive multimedia tools positively influence motivation and participation, which are key factors in effective learning.
Interactive features such as quizzes, simulations, and gamification elements increase learner motivation and retention rates (Mayer, 2021). Well-implemented multimedia tools significantly enhance learning engagement.

Table 1. Level of interactive multimedia tools in terms of engagement level.

Statements	Mean	Description
1. I found the interactive features of the multimedia tools engaging.	4.28	Highly Effective
2. I feel more involved in the learning process when using Interactive Multimedia Tools.	4.20	Effective
3. I actively participate in learning activities when using Interactive Multimedia Tools.	4.11	Effective
4. I feel more motivated to learn when using Interactive Multimedia Tools.	4.06	Effective
5. The interactive elements encourage me to engage more deeply with the reading material.	3.94	Effective
6. The multimedia tools help me stay engaged with the reading	3.72	Effective

material from start to finish.		
Mean	**4.05**	**Effective**

4.21-5.00	Highly Effective
3.41-4.20	Effective
2.61-3.40	Moderately Effective
1.81-2.60	Less Effective
1.00-1.80	Not effective

Content Understanding

Table 2 reveals the result of the interactive multimedia tools in terms of content understanding with a total weighted mean of 3.37, which is **effective.** They were effective in the interactive multimedia tools that helped them better understand the reading material, the visual elements in the multimedia tools enhanced their comprehension of the text, and the pacing of the content delivery through multimedia tools was appropriate for their learning. The interactive multimedia tools help them better understand the main ideas of the reading material, the visuals and animations in the multimedia tools clarify complex concepts in the text. The multimedia tools allow them to apply the knowledge I've gained in practical exercises.

This implies that multimedia tools are effective in clarifying complex concepts and reinforcing main ideas, educators should integrate visuals, animations, and interactive elements to improve learner engagement and understanding. The lower mean score for applying knowledge practically suggests a need for more interactive simulations or hands-on digital activities to reinforce learning outcomes.

It indicates that Multimedia-based learning environments promote deeper cognitive processing, enhancing retention and critical thinking skills (Clark & Mayer, 2016).

Table 2. Level of interactive multimedia tools in terms of content understanding.

Statements	Mean	Description
1. The interactive multimedia tools helped me better understand the reading material.	4.17	Effective
2. The visual elements in the multimedia tools enhanced my comprehension of the text.	4.13	Effective
3. The pacing of the content delivery through multimedia tools was appropriate for my learning.	4.02	Effective
4. The interactive multimedia tools help me better understand the main ideas of the reading material.	4.00	Effective
5. The visuals and animations in the multimedia tools clarify complex concepts in the text.	3.86	Effective
6. The multimedia tools allow me to apply the knowledge I've gained in practical exercises.	3.61	Effective
Mean	**3.97**	**Effective**

4.21-5.00	Highly Effective
3.41-4.20	Effective
2.61-3.40	Moderately Effective

1.81-2.60 Less Effective
1.00-1.80 Not effective

Interactivity

Table 3 reveals the result of the level of interactive multimedia tools in terms of interactivity effective, with a total weighted mean of 3.79 which is effective. The interactivity in the multimedia tools helps them better comprehend the reading materials. The multimedia tool allows them to interact with the content in multiple ways. The multimedia tool is easy to navigate. The tool allows for easy interaction with the content. The instructions provided in the tool are clear and easy to follow.

The results imply that interactive multimedia tools significantly contribute to learning experiences by providing multiple interaction pathways. While multimedia interactivity enhances engagement and comprehension, its effectiveness is contingent upon usability and instructional clarity.

Ali and Sahab (2022) demonstrated that multimedia tools outperform traditional methods in practical skill development, attributing this to enhanced teacher-student interaction and visual-audio integration.

Table 3. Level of interactive multimedia tools in terms of interactivity.

Statements	Mean	Description
1. The interactivity in the multimedia tools helps me better comprehend the reading materials.	4.05	Effective
2. The multimedia tool allows me to interact with the content in multiple ways	3.97	Effective
3. The multimedia tool is easy to navigate.	3.83	Effective
4. The tool allows for easy interaction with the content.	3.70	Effective
5. The instructions provided in the tool are clear and easy to follow.	3.63	Effective
6. The interactive features of the tool enhance the overall reading comprehension experience.	3.55	Effective
Mean	**3.79**	**Effective**

4.21-5.00 Highly Effective
3.41-4.20 Effective
2.61-3.40 Moderately Effective
1.81-2.60 Less Effective
1.00-1.80 Not effective

Ease of Use

Table 4 reveals the level of the interactive multimedia in terms of ease of use with a weighted mean score of 4.18, which is effective. The instructions provided with the tools were clear and helpful. The multimedia tool is easy for students to navigate and use independently. The multimedia tools were easy to navigate and use. They can easily access and use the various interactive features of the tool without additional help.

It implies that interactive multimedia enhances engagement and skill retention by reducing cognitive load through intuitive interfaces. Clear instructional design and intuitive interactivity contribute to better

comprehension and retention of information.

Sweller (2019) stressed out that effective multimedia learning environments should prioritize user-friendly interfaces, clear navigation, and well-structured instructional guidance to optimize cognitive processing. interactive multimedia tools can be highly effective when they incorporate clear instructions and accessible features while minimizing user frustration.

Table 4. Level of interactive multimedia tools in terms of end of use.

Statements	**Mean**	**Description**
1. The multimedia tools were easy to navigate and use.	4.17	Effective
2. I could access all necessary features without difficulty.	4.13	Effective
3. The instructions provided within the tools were clear and helpful.	4.28	Highly Effective
4. The multimedia tool is easy for students to navigate and use independently.	4.20	Effective
5. I can easily access and use the various interactive features of the tool without additional help.	4.17	Effective
6. The interactive elements are intuitive and do not confuse or frustrate students.	4.13	Effective
Mean	**4.18**	**Effective**

4.21-5.00 Highly Effective
3.41-4.20 Effective
2.61-3.40 Moderately Effective
1.81-2.60 Less Effective
1.00-1.80 Not effective

Reading Comprehension

The second part is the level of reading comprehension of students in terms of vocabulary knowledge, critical comprehension and text response**.**

Vocabulary Knowledge

Table 5 reveals on the level of reading comprehension in terms of vocabulary knowledge with overall weighted mean of 4.21 which is Independent. They find it easy to use new vocabulary words correctly in their own writing and speaking. They also feel confident in their ability to understand the meanings of new words encountered while reading. They also regularly encounter difficulties when trying to understand new vocabulary in reading materials.

It implies that that students with a rich vocabulary are better equipped to understand complex texts, facilitating improved academic performance across various subjects. Vocabulary knowledge contributes to reading comprehension both directly, through word recognition, and indirectly, via reading fluency and decoding abilities.

Gu (2017) further emphasized that vocabulary depth—understanding nuanced word meanings plays a critical role in tasks like summary writing and critical analysis.

Table 5. Level of learners' reading comprehension in terms of vocabulary knowledge.

Statements	Mean	Description
1. Students feel confident in my ability to understand the meanings of new words encountered while reading.	4.17	Instructional
2. Students often use context clues to determine the meaning of unfamiliar words in a text.	4.20	Instructional
3. Students regularly encounter difficulties when trying to understand new vocabulary in reading materials.	4.17	Instructional
4. Students' vocabulary knowledge helps them to better understand and remember what I read.	4.13	Instructional
5. Students find it easy to use new vocabulary words correctly in their own writing and speaking.	4.28	Independent
Mean	**4.21**	**Independent**

4.21-5.00 Independent
3.41-4.20 Instructional
2.61-3.40 Frustration
1.81-2.60 Poor
1.00-1.80 No Comprehension at All

Critical Comprehension

Table 6 reveals the level of reading comprehension in terms of critical comprehension with an overall weighted mean of 4.14 which means instructional. They can determine the author's purpose and the message they are trying to convey and critically evaluate the arguments presented in a text and assess their validity. They can identify the main idea of a text accurately and recognize and explain the details that support the main idea.

It implies that proficiency in critical reading comprehension is essential for students to engage deeply with texts, fostering critical thinking and problem-solving abilities. While students possess foundational critical reading skills, they still require targeted support to fully develop these competencies. The lower performance in making logical inferences is particularly concerning, as this skill is essential for higher-order thinking and problem-solving.

Table 6. Level of Learners' Reading Comprehension in terms of Critical Comprehension.

Statements	Mean	Description
1. Students can identify the main idea of a text accurately.	4.17	Instructional
2. Students can recognize and explain the details that support the main idea.	4.13	Instructional
3. Students can determine the author's purpose and the message they are trying to convey.	4.28	Independent
4. Students can critically evaluate the arguments presented in a text and assess their validity.	4.20	Instructional

5. Students can make logical inferences based on the information presented in the text.	3.94	Instructional
Mean	**4.14**	**Instructional**

4.21-5.00 Independent
3.41-4.20 Instructional
2.61-3.40 Frustration
1.81-2.60 Poor
1.00-1.80 No Comprehension at All

Response to Text

Table 7 reveals the level of reading comprehension in terms of response to text with overall weighted mean of 4.14 which means Instructional. The text included relevant examples that helped them clarify the main points. The text was easy to understand. They were able to follow the main ideas of the text without difficulty.

It implies that while students can navigate the texts with some assistance, there is room for improvement toward achieving 'Independent' comprehension. This underlines the need for targeted instructional strategies to enhance students' autonomous reading abilities.

Table 7. Level of learners' reading comprehension in terms of response to text.

Statements	Mean	Description
1. The text was easy to understand.	4.20	Instructional
2. Student was able to follow the main ideas of the text without difficulty.	4.17	Instructional
3. The vocabulary used in the text was appropriate for students' level of understanding.	4.13	Instructional
4. Students could easily summarize the main points of the text after reading it.	3.94	Instructional
5. The text included relevant examples that helped clarify the main points.	4.28	Instructional
Mean	**4.14**	**Instructional**

4.21-5.00 Independent
3.41-4.20 Instructional
2.61-3.40 Frustration
1.81-2.60 Poor
1.00-1.80 No Comprehension at All

Relationship of the Interactive Multimedia Tools and Learners' Reading Comprehension

Engagement level

Table 8 depicts the relationship between interactive multimedia tools and learners' comprehension. The correlation matrix shows of interactive multimedia tools and learners comprehension in terms of engagement level has a significant relationship with the parameters used to measure the vocabulary

knowledge (pr=**0.701**,** probability = .00), critical comprehension (pr=**0.747****, probability=0.00), and response to text (pr=**0.747****, probability=0.00).

It implies that students who actively engage with multimedia tools are more likely to develop stronger vocabulary knowledge, improve their critical comprehension skills, and respond to texts more effectively.

Zheng, Warschauer, Lin & Chang (2020) demonstrate positive correlations between digital media use and reading comprehension, other research indicates potential drawbacks. Children's interactive reading applications are effective in promoting emergent literacy skills, particularly when the interactive elements are congruent with the story content, thereby enhancing engagement and comprehension.

Content Understanding

Table 8 depicts the relationship between interactive multimedia tools and learners' comprehension. The correlation matrix shows interactive multimedia tools and learners comprehension in terms of content understanding has a significant relationship with the parameters used to measure the vocabulary knowledge (pr=0.471**, probability = .00), critical comprehension (pr=0.543**, probability=0.00), and response to text (pr=0.543**, probability=0.00).

This implies that tools and strategies enhancing learners' grasp of material substantially contribute to their reading development. While multimedia tools may offer interactive features, these elements alone do not necessarily lead to improved reading comprehension.

Supported by McNamara and Magliano (2019) emphasize that deep comprehension strategies, such as elaborative interrogation and self-explanation, significantly enhance reading outcomes. Interventions improving content-related inference skills lead to higher comprehension scores.

Interactivity

Table 8 depicts the relationship between interactive multimedia tools and learners' comprehension. The correlation matrix shows interactive multimedia tools and learners comprehension in terms of interactivity has no significant relationship with the parameters used to measure the vocabulary knowledge (pr=0.092, probability = .146), critical comprehension (pr=0.094, probability=0.139), and response to text (pr=0.094, probability=0.139).

This implies that while multimedia tools may offer interactive features, these elements alone do not necessarily lead to improved reading comprehension. This could show that the effectiveness of multimedia learning tools is more dependent on engagement and content depth rather than mere interactive elements.

Ease of Use

Table 8 depicts the relationship between interactive multimedia tools and learners' comprehension. The correlation matrix shows interactive multimedia tools and learners comprehension in terms of end of use has a significant relationship with the parameters used to measure the vocabulary knowledge (pr=0.862**, probability = .00), critical comprehension (pr=0.898**, probability=0.00), and response to text (pr=0.898**, probability=0.00).

This implies that when multimedia tools are easy to navigate and use, learners demonstrate a substantial improvement in vocabulary knowledge, critical comprehension, and response to text. When learners find

multimedia tools intuitive and user-friendly, their cognitive load decreases, allowing them to focus more on comprehension tasks rather than on navigating the technology itself.

Zheng, Warschauer, Lin and Chang (2020) reported that perceived ease of use significantly predicts learners' attitudes and their intention to continue using such educational technologies. Ease of use is a significant predictor of student satisfaction, which in turn affects learning outcomes. These studies collectively highlight that user-friendly educational tools not only enhance immediate learning outcomes but also promote sustained engagement and satisfaction among learners.

Table 8. Correlation matrix shows the relationship between interactive multimedia tools and learners reading comprehension.

Spearman Rho				
Multimedia Tools		**Vocabulary Knowledge**	**Critical Comprehension**	**Response to text**
Engagement Level	Cor. Coef.	**0.701****	**0.747****	**0.747****
	Probability	0.000	0.000	0.000
Content Understanding	Cor. Coef.	**0.471****	**0.543****	**0.543****
	Probability	0.000	0.000	0.000
Interactivity	Cor. Coef.	0.092	0.094	0.094
	Probability	0.146	0.139	0.139
Ease of Use	Cor. Coef.	**0.862****	**0.898****	**0.898****
	Probability	0.000	0.000	0.000

**.*Corre*lation is significant at the 0.01 leve*l.*

**.Correlation is significant at the 0.05 level.*

Influence of the Interactive Multimedia Tools on the Learners' Reading Comprehension

Interactive Multimedia Tools on Vocabulary Knowledge

The coefficient matrix in Table 9 discloses that Interactive Multimedia Tools on the Learners' Reading Comprehension on vocabulary knowledge in terms of engagement level (P=0.000 **, t value=12.250), content understanding (P=0.000**, t value=-6.416), interactivity (P=0.245, t value=1.165), and ease of use (P=.000**, t value=-24.487) has significant influence. Therefore, the hypothesis of the study was rejected, since the computed probability value (0.000**) is less than the set 1% level of significance.

It implies that when learners find the multimedia tools easy to use and engaging, their vocabulary acquisition significantly improves.

Multimedia-enriched content greatly aids vocabulary retention, according to Aloraini (2018), especially when learners are actively involved with the material through animations, audio, and instant feedback systems. Multimedia and pedagogical interactivity together point to a paradigm shift in the way vocabulary and critical comprehension are developed in online learning environments. Learners might prioritize grasping the overall message or narrative, thereby neglecting unfamiliar lexical items unless they are explicitly highlighted.

Table 9. Influence of the interactive multimedia tools on the learners reading comprehension in terms of vocabulary knowledge.

Multimedia Tools	Coef. β	Std. Error	t – value	Probability
(Constants)	0.192	0.124	1.550	0.122
Engagement level	0.322	0.026	12.250	0.000**
Content understanding	-0.197	0.031	-6.416	0.000**
Interactivity	0.025	0.021	1.165	0.245
Ease of use	0.815	0.033	24.487	0.000**
R^2 0.884			F – Value = 470.636	
Probability = 0.004**			** = Significant at 1% level.	

Interactive Multimedia Tools on Critical Comprehension

The coefficient matrix in Table 10 discloses that Interactive Multimedia Tools on the Learners' Reading Comprehension on critical comprehension in terms of engagement level (P=0.000 **, t value=6.229), content understanding (P=0.059, t value=-1.898), interactivity (P=0.132, t value=-1.513), and ease of use (P=.000**, t value=8.915) has significant influence. Therefore, the hypothesis of the study was rejected, since the computed probability value (0.000**) is less than the set 1% level of significance.

This implies that the more engaging and user-friendly a multimedia tool is, the more it supports critical comprehension. Engagement likely fosters deeper cognitive investment and sustained attention, essential for critical analysis. Ease of use may reduce cognitive overload, allowing learners to focus on textual analysis rather than navigating the platform. Interestingly, the negative, though not significant, coefficients for content understanding and interactivity might imply a complex dynamic where overly complex content delivery or high interactivity without cognitive alignment may distract rather than aid critical thinking.

According to Moreno and Mayer (2019), when multimedia tools are created using the concepts of coherence and segmentation, critical comprehension is improved through engagement and ease of navigation.

Table 10. Influence of the interactive multimedia tools on the learners reading comprehension in terms of critical comprehension.

Multimedia Tools	Coef. β	Std. Error	t – value	Probability
(Constants)	1.530	0.209	7.313	0.000
Engagement level	0.277	0.044	6.229	0.000**
Content understanding	-0.099	0.052	-1.898	0.059
Interactivity	-0.055	0.036	-1.513	0.132
Ease of use	0.501	0.056	8.915	0.000**
R^2 = 0.555			F – Value = 76.802	
Probability = 0.004**			** = Significant at 1% level.	

Interactive Multimedia Tools on Response to Text

The coefficient matrix in Table 11 discloses that Interactive Multimedia Tools on the Learners' Reading Comprehension on response to text in terms of engagement level (P=0.000 **, t value=22.800), content understanding (P=0.001**, t value=-3.279), interactivity (P=0.148, t value=1.452), and ease of use (P=.000**, t value=32.071) has significant influence. Therefore, the hypothesis of the study was rejected, since the computed probability value (0.000**) is less than the set 1% level of significance.

The R^2 value of 0.948 indicates that the model explains 94.8% of the variance in learners' response to text, which is exceptionally high. This implies a robust influence of the selected multimedia variables on reading comprehension outcomes. The F-value of 1130.654, significant at $p = 0.004$, further confirms the overall significance of the regression model. Interestingly, content understanding shows a negative coefficient ($\beta = -0.062$, $p < 0.01$), which may imply that when multimedia tools overly simplify or visually dominate content, deeper comprehension could be hindered, potentially leading to superficial engagement with the text.

It implies that the positive impact of engagement level and ease of use emphasizes the need to design interactive tools that are not only stimulating but also intuitive. On the other hand, the negative coefficient for content understanding invites a deeper look into cognitive load theory and how multimedia might unintentionally detract from analytical thinking if not well-balanced.

To encourage critical responses rather than passive consumption, as stated by Kim and Reeves (2019). contend that interactive texts need to carefully scaffold students' engagement. Multimedia resources that encourage inquiry and self-directed learning greatly enhanced critical literacy abilities in their study on digital scaffolds. Together, these pieces support the idea that, with careful multimedia integration and pedagogically motivated design, students' engagement with text can be enhanced.

Table 11. Influence of the interactive multimedia tools on the learners reading comprehension in terms of response to text.

Multimedia Tools	Coef. β	Std. Error	t – value	Probability
(Constants)	0.053	0.077	0.689	0.491
Engagement level	0.371	0.016	22.800	0.000**
Content understanding	-0.062	0.019	-3.279	0.001**
Interactivity	0.019	0.013	1.452	0.148
Ease of use	0.661	0.021	32.071	0.000**
R^2 = 0.948		F – Value = 1130.654		
Probability = 0.004**		** = Significant at 1% level.		

Table 12. Summary of the Influence of the interactive multimedia tools on the learners reading comprehension

Multimedia Tools		Vocabulary Knowledge	Critical Comprehension	Response to text
Engagement level	R2	**0.884**	**0.555**	**0.948**
	Probability	0.000**	0.000**	0.000**
	F-Value	470.636	76.802	1130.654
Content	R2	**0.884**	**0.555**	**0.948**

Understanding	Probability	0.000**	0.059	0.000**
	F-Value	470.636	76.802	1130.654
	R2	0.884	0.555	0.094
Interactivity	Probability	0.245	0.132	0.148
	F-Value	470.636	76.802	1130.654
Ease of Use	R2	**0.884**	**0.555**	**0.948**
	Probability	0.000**	0.000**	0.000**
	F-Value	470.636	76.802	1130.654

CONCLUSION

Based on the findings of the study, the significant impact of interactive multimedia tools on learners' reading comprehension, particularly in terms of engagement level, content understanding, and ease of use. The positive relationship between these tools and reading comprehension suggests that incorporating interactive multimedia elements enhances students' motivation and interest in reading. Higher engagement levels likely contribute to improved focus and retention, making it easier for learners to understand and process textual content. Furthermore, the structured and visually appealing presentation of information in multimedia formats supports different learning styles, making reading comprehension more accessible and effective for diverse learners.

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