

Enhancing Reading Comprehension of Key Stage 2 Learners through Interactive Multimedia Tools

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Abstract:

This study aimed to determine the impact of interactive multimedia tools on the reading comprehension of Key Stage 2 learners at Campatud Elementary School, Loon South District, Bohol, during the School Year 2025–2026. Using a descriptive-correlational research design, the study assessed the demographic profiles of four female teachers and their pupils, the extent of tool utilization (televisions, laptops, and smartphones), and the resulting effects on learner engagement and motivation. Statistical analysis using the Pearson Product-Moment Correlation Coefficient revealed a significant relationship between the use of multimedia tools and reading comprehension levels, with a computed r -value of 0.85 and a p -value of 0.02, leading to the rejection of the null hypothesis. Key challenges identified by teachers included gaps in digital literacy and unreliable internet connectivity. The findings indicate that interactive multimedia tools significantly enhance cognitive scaffolding and pupil engagement. Based on these results, a set of multimedia-assisted reading exercises was developed to further improve literacy outcomes. The use of visual and auditory aids facilitated a deeper understanding of abstract concepts, while the interactive nature of the tools reduced boredom and increased motivation. Based on the findings, it is concluded that interactive multimedia is a potent instructional medium for improving reading comprehension. While technology does not replace the teacher, it acts as a critical supportive tool that makes learning more flexible, engaging, and accessible, particularly for students who struggle with traditional printed texts. It is recommended that the school administration and faculty prioritize the integration of interactive digital resources in early literacy programs. Continuous professional development should be provided to teachers to enhance their digital pedagogical skills.

Furthermore, the school should invest in sustaining these technological aids to ensure all pupils, including those in rural settings, have equitable access to innovative learning tools.

Keywords: Master of Arts in Supervision and Administration, Interactive Multimedia, Reading Comprehension, Literacy Instruction, Campatud Elementary School, Cebu Technological University, Cebu, Philippines.

Introduction

One promising approach to improving both motivation and reading proficiency is the integration of instructional media into early literacy instruction [1]. Research has shown that the use of appropriate instructional media can significantly enhance student motivation and engagement. Interactive and visually appealing media can make abstract reading concepts more concrete, facilitating comprehension and retention. Studies have demonstrated that the use of multimedia tools, such as interactive e-books, educational games, and audiovisual aids, can significantly improve early reading skills [2]. For instance, Kim & Lee found that students exposed to interactive multimedia showed marked improvements in decoding skills, vocabulary acquisition, and reading comprehension compared to those taught through traditional methods [3].

Reading is the cornerstone of all academic learning. In the Philippine basic education curriculum, the ability to comprehend written text is not merely a linguistic skill but a fundamental tool for acquiring knowledge in Science, Mathematics, and Social Studies. However, despite efforts to improve literacy, many Filipino learners still struggle to bridge the gap between "reading words" and "understanding meaning." According to recent results from the **Philippine Informal Reading Inventory (Phil-IRI)**, a significant number of elementary pupils remain at the "Frustration Level," particularly in rural school settings [4].

As stated by, the capability to read is crucial for attaining academic success and ongoing learning in today's digital age. A strong understanding of written content establishes the foundation for knowledgeable citizenship and individual empowerment while also enhancing academic achievement in various fields. Traditional reading instruction methods, which often depend on passive interactions with texts, have been shown to restrict students' deep understanding and motivation. Nonetheless, providing diverse engagement opportunities through the integration of interactive and multimedia tools—like e-books, educational applications, videos, and gamified learning environments—has generated interest as a potential approach for enhancing reading skills. Educators need to adapt to the diverse needs of students who are increasingly familiar with digital communication due to changes in teaching approaches. Research suggests that considering various learning styles, multimedia technologies can significantly enhance student engagement, lessen boredom, and foster deeper understanding. To exemplify the impact of technology on reading education, Zepp emphasize the need to train preservice teachers in effectively utilizing multimedia instruction. The integration of multimedia offers significant potential, but numerous challenges remain in the realm of educational technology. Issues related to cognitive overload, potential dependence on technology, and inequalities stemming from unequal access to digital resources have been highlighted in previous studies. Alongside tackling barriers to effective implementation, the study by Noordan and Yunus also highlights the teaching efficacy of ICT in enhancing reading comprehension [5]. These findings highlight a significant gap in the literature and underscore the need for comprehensive investigation into the intricate relationships between multimedia tools and reading pedagogy

Recent learning technologies offer a significant benefit compared to traditional ones (such as books): they provide greater flexibility and customization in learning options. Though a printed book is uniform and standardized, a universally designed digital book can readily offer the choices and alternatives required by students with disabilities: refreshable Braille for visually impaired

students, text-to-speech for those with dyslexia, Spanish translations for English learners, and more. With obstacles minimized, these students could advance in their science, history, and other classes. In the absence of these options, they encounter unfair and unnecessary barriers to learning in today's world.

Miller suggests that incorporating technology connected to multimedia resources offers numerous chances for language acquisition, as demonstrated by Miller. Teachers can use the provided resources to determine the language needs of students, as speaking, learning, and listening abilities are deeply intertwined in the process. Current students are heavily involved in contemporary communication methods; hence, incorporating technology in language classes can foster enhanced interest among learners. Miller also remarked that while technology can never take the place of a teacher in the classroom, it can serve a supportive function. The research suggested that it is equally essential to determine which application would best meet the particular needs of the students when comparing technologies. In the modern era, kids are already proficient with technology and possess skills beyond basic computer knowledge. They frequently utilize multimedia alongside various online resources both within and beyond the school grounds. To ensure continuous engagement, facilitators must adjust to the fast-changing environment to fully utilize the current digital tools available.

Hadi, Waluyo, state that the advancement of information and communication technology is extremely fast in today's world, particularly in the multimedia sector. Multimedia is now employed as a tool and medium for learning due to its capabilities. Students are anticipated to comprehend the lessons presented more thoroughly. Research indicates that a person will retain more than just what they saw, heard, and experienced. This drives the education sector to compete in utilizing multimedia as a method and medium for student learning. For instance, while studying the solar system at school, if every school needed to purchase teaching aids for students to visualize a model of the solar system, schools now no longer have to acquire props. Due to advancements in multimedia technology, schools merely need to show videos that illustrate the appearance of the solar system. Multimedia can facilitate active learning for students, influencing their cognitive abilities and supplying content for the media. Multimedia fundamentally involves two components: text (spoken or written) and visuals (drawings, photographs, animations, or films). Interactive multimedia can be produced through different methods, one being animation combined with video. Interactive multimedia serves a purpose, one of which involves the use of a computer. A creative educational approach centered on the multimedia project provides students the opportunity to enhance their language skills. Incorporating multimedia into education aids in training and fostering students' ability to articulate their thoughts verbally without prior preparation. Interactive multimedia can enhance learning motivation since students can individually grasp the subject matter comprehensively. Students can also enhance their skills autonomously through interactive multimedia, effective learning, and efficiency, resulting in greater time savings compared to traditional learning [6].

Multimedia conveys information through text, audio, visuals, and interactive components. Interactivity is characterized as a navigational element. Earlier studies indicated that multimedia can enhance students' creative thinking and facilitate information retention. In conclusion, multimedia is the integration of two or more forms of communication media to convey or generate content presented through a computer or manipulated digitally, allowing for interactive control to create an appealing display [7].

At Campatud Elementary School, teachers have observed a growing challenge: traditional printed modules and standard chalk-and-talk methods are often insufficient to sustain the attention of "digital native" learners. Many pupils can decode words phonetically but fail to synthesize information, draw inferences, or identify the main idea of a passage. This disconnect often leads to low academic performance and a lack of interest in classroom activities.

The emergence of Interactive Multimedia offers a promising intervention. Unlike static textbooks, interactive multimedia integrates text, graphics, animation, audio, and video to create a multisensory learning environment. Mayer's Cognitive Theory of Multimedia Learning posits that people understand information more thoroughly when words and images are used together rather than just words on their own. Providing instant feedback via gamified quizzes and visual signals through digital storytelling allows interactive tools to clarify intricate ideas and enhance reading into a more engaging, self-directed activity.

This study is prompted by the urgent need to elevate the reading proficiency of pupils at Campatud Elementary School. While the Department of Education (DepEd) promotes the "Digital Rise" program, there is a lack of localized data on how these tools specifically affect the comprehension levels of learners in this particular community.

By evaluating the impact of interactive multimedia, this research seeks to provide empirical evidence that could guide teachers and school administrators in integrating ICT-based strategies. Ultimately, the goal is to transform reading from a passive task into an interactive journey, ensuring that no pupil is left behind in the pursuit of functional literacy.

Theoretical Background

The foundation of this study is built upon several established educational theories that link sensory input, cognitive processing, and learner engagement. Cognitive Theory of Multimedia Learning (Richard Mayer); Schema Theory (Jean Piaget & Frederic Bartlett); Theory of Connectionism (Edward Thorndike); and the Zone of Proximal Development (Lev Vygotsky). Together, these theories provide a multidimensional lens for examining the effect of interactive multimedia tools in pupil's reading comprehension

Cognitive Theory of Multimedia Learning (Richard Mayer) The primary anchor of this study is Richard Mayer's Cognitive Theory of Multimedia Learning. This theory posits that the human brain processes information through two channels: auditory and visual. Mayer, R. E. People learn more deeply from words and pictures than from words alone.

At Campatud Elementary School, using interactive multimedia allows pupils to see an illustration of a concept while simultaneously hearing it described. This "dual coding" reduces the cognitive load on the brain, making it easier for young learners to construct mental models of the text they are reading.

Schema Theory (Jean Piaget & Frederic Bartlett) Schema theory suggests that reading comprehension is a process of relating new information from a text to "schemas"—the prior knowledge already stored in a student's mind. Yanza Condo, M. B., & Vele Chasi, B. E.. Understanding occurs when a reader can connect the text to their own experiences [8]. Interactive multimedia provides "virtual experiences" (through videos or animations) that build background knowledge for pupils who may have limited exposure to certain topics, thereby providing the necessary schema to understand more complex stories [9].

Theory of Connectionism (Edward Thorndike) This theory emphasizes the "Stimulus-Response" bond. Thorndike argued that learning is strengthened when followed by a "satisfying state of affairs" (the Law of Effect). EDUCATION, L. I. P. Immediate feedback reinforces learning. The "interactive" element of multimedia—such as a digital star appearing when a pupil chooses the correct answer or an audio prompt encouraging them to try again—acts as a positive reinforcer. This keeps the pupils of Campatud Elementary motivated and engaged in the reading process [10].

Lev Vygotsky's concept of the **Zone of Proximal Development (ZPD)** highlights the difference between what a student can achieve independently versus what they can accomplish with help. To foster growth, educators use **scaffolding** to bridge this gap [11]. As Murray and Arroyo note, this

involves both mental and emotional balance: tasks must be challenging enough to avoid boredom but accessible enough to prevent frustration.

Since every learner has different needs depending on the situation, digital tools are excellent for providing personalized support. For example, a student who is struggling can use multimedia features to look up a word's sound or meaning instantly, allowing them to keep learning without needing to wait for a teacher.

Transactional reading theory, developed by Louise Rosenblatt, posits that meaning is not fixed in a text but is actively created through a dynamic transaction between the reader and the text at a specific time and context. The reader's past experiences, knowledge, and emotions ("linguistic-experiential reservoir") interact with the text to shape interpretation. Meaning arises during the reading event itself, as the reader acts upon the text and is acted upon by it. The reader brings their own experiences, beliefs, and emotions (schema) to the text, which means two readers may have different, yet valid, interpretation. The text acts as a blueprint or guide, limiting possible interpretations to ensure the meaning is still rooted in the text's symbols. Rosenblatt defined two main ways readers approach a text. Reading for information, focusing on what is to be carried away after reading (e.g., studying a textbook). Reading for experience, focusing on what happens during the reading process (e.g., feeling, imaging, and enjoying a poem or novel). The theory emphasizes a two-way process rather than a linear transmission of knowledge from author to reader, as detailed in "The Reader the Text the Poem" on YouTube. This theory suggests that to understand a text fully, teachers should encourage readers to connect their personal experiences to the material and to recognize their role in the creation of meaning. Unlike "interaction" (which implies two separate entities acting on each other like billiard balls), a transaction is a process where the reader and text condition each other. The text remains mere "ink on paper" until a reader gives it life. Rosenblatt used the term "poem" to describe the unique mental work or "evocation" created during this transaction. This "poem" is different for every reader and can even be different for the same reader on a second reading. Readers bring their own past experiences, emotions, and cultural background to the text, which they use to synthesize and organize the cues provided by the author. Teachers focus on validating students' personal responses and using them as a starting point for deeper critical reflection. Techniques like Literature Circles and Book Clubs are used to share and compare diverse interpretations. Dialogue journals allow students to record their evolving responses to a text over time.

Universal Design for Learning (UDL) is an educational framework developed by David H. Rose, Ed.D., and his colleagues at CAST to develop adaptable learning settings that cater to personal learning variations. Dr. Rose, a developmental neuropsychologist, co-founded CAST and served as a longtime faculty member at the Harvard Graduate School of Education. Grounded in cognitive neuroscience, the UDL framework identifies three primary brain networks that must be engaged for effective learning: Multiple Means of Engagement (The "Why" of Learning): Stimulates interest and motivation for learning. It involves providing options for self-regulation, sustaining effort, and recruiting interest to tap into learners' affective networks. Multiple Means of Representation (The "What" of Learning): Presents information and content in different ways. This addresses recognition networks by providing alternatives for perception, language, and comprehension. Multiple Means of Action and Expression (The "How" of Learning): Offers students various ways to navigate learning environments and express what they know. This supports strategic networks by providing options for physical action, expression, and executive functions. UDL emphasizes creating a curriculum that is accessible to all students from the beginning, rather than retrofitting specialized supports later.

The primary goal is to help every student become an "expert learner"—someone who is purposeful and motivated, resourceful and knowledgeable, and strategic and goal-directed. It assumes that the "burden" of failure lies in the design of the curriculum (e.g., rigid textbooks) rather than in the students themselves. UDL relies on high levels of flexibility in goals, methods, materials, and

assessments to meet the diverse needs of all students, including those with disabilities and English language learners.

The primary aim of UDL is to ensure that every learner evolves into an “expert learner.” Skilled learners are intentional and driven, clever and informed, as well as tactical and aim-focused regarding their education. UDL is an effective strategy since it enables you to foresee and prepare for all your students right from the beginning of your lesson. It can assist you in ensuring that the widest variety of students can reach and participate in learning — not merely specific students.

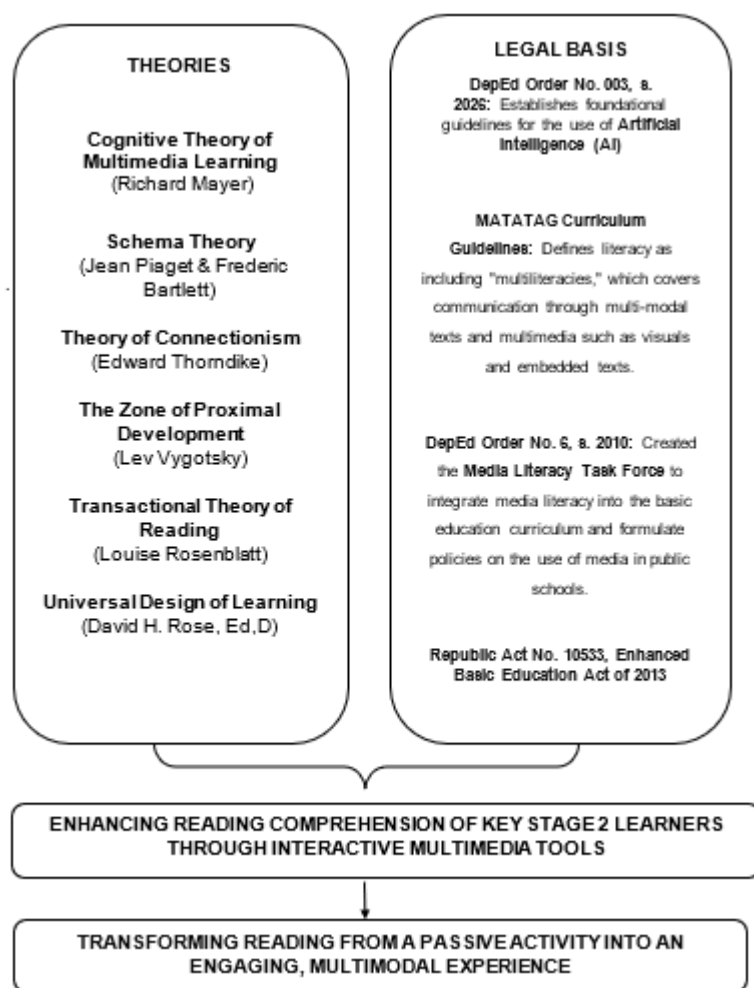


Figure 1. Theoretical Framework of the Study.

DepEd Order No. 003, s. 2026[12], titled “Foundational Guidelines on AI in Basic Education”, shifts from banning artificial intelligence to promoting its responsible, ethical use as a complementary, human-centered tool. Issued in February 2026, it covers teaching, learning, assessment, and governance, emphasizing AI literacy to support personalized learning without replacing teachers. Replaces prohibition with guidelines for safe, ethical integration, treating AI as a tool similar to libraries or calculators. Covers teaching and learning, assessment, teacher professional development, and educational governance across all levels [13]. Emphasizes that AI is a tool to support pedagogy, not a replacement for teacher-student interaction. Focuses on developing AI literacy among learners, preparing them for a technology-driven world while emphasizing data privacy and accountability. The guidelines aim to prepare learners for a future

where AI is ubiquitous, with an emphasis on fostering critical thinking and maintaining academic integrity.

MATATAG Curriculum Guidelines: Defines literacy as including "multiliteracies," which covers communication through texts that combine multiple modes and multimedia elements like images and integrated texts. Literacy encompasses not just the ability to read and write effectively through language and text but also involves multiliteracies, which address multiple forms of communication utilizing multi-modal texts and multimedia that emphasize visuals and integrated texts. In MATATAG CURRICULUM, reading is redefined to go beyond traditional reading and writing. It adopts a "multiliteracies" framework to prepare learners for a complex, information-rich world. Multimodal Texts literacy involves communicating through various modes beyond plain text, integrating visuals, audio, gestural, and spatial elements. It specifically covers the use of multimedia and digital texts, highlighting the importance of understanding embedded texts within visual or interactive media.

DepEd Order No. 6, s.[14]: Created the Media Literacy Task Force to integrate media literacy into the basic education curriculum and formulate policies on the use of media in public schools. DepEd Order No. 6, s., created the DepEd Media Literacy Task (MLTF) to protect children from negative media effects by integrating media literacy into the basic education curriculum. The MLTF develops the National Media Literacy Education Plan (NMLEP) to guide curriculum integration, policy formulation on media use in schools, and the development of learning resources. Establishing guidelines for the responsible use of media in public schools and the creation of learning materials. Promoting media literacy education across all DepEd offices and schools. Collaborating with media organizations to foster critical thinking and digital literacy. The order was prompted by studies showing high, often unsupervised, media consumption among Filipino children, aiming to equip them with the skills to analyze, evaluate, and create media responsibly.

Republic Act No. 10533, known as the Enhanced Basic Education Act of 2013, reorganized the educational system in the Philippines into the K to 12 program. Enacted on May 15, 2013, it requires one year of kindergarten, six years of elementary schooling, and six years of secondary education (four years of Junior High and two years of Senior High), with the goal of improving curriculum quality and preparing graduates for the workforce, entrepreneurship, or further education. It established the 13-year basic education system, beginning with kindergarten (for 5-year-olds), then elementary (6 years), Junior High (4 years), and concluding with Senior High School (2 years). The legislation requires a curriculum that is learner-focused, inclusive, and suitable for developmental stages, utilizing a spiral progression method. It necessitates the use of the native language (regional language) as the main medium of instruction from kindergarten to Grade 3, with Filipino and English introduced progressively. This element presents specialization pathways (Academic, Technical-Vocational-Livelihood, Arts and Design, and Sports) aimed at enhancing career readiness. The Act facilitates teacher training to align with the new curriculum standards and permits the employment of professionals to instruct specialized subjects. It provided assistance for students, including the Senior High School Voucher Program, to enable their enrollment in private or non-DepEd institutions. Facilitated partnerships among the Department of Education (DepEd), CHED, and TESDA to oversee the transition and leverage resources from higher education institutions. Mandated a midterm report to Congress by the conclusion of SY 2014-2015 to assess advancements in tackling shortages of educators, classrooms, and instructional materials

The Problem

Statement of the Problem

This study aimed to determine the Enhancing Reading Comprehension of Key Stage 2 Learners through Interactive Multimedia Tools at Campatud Elementary School, Loon South District, Bohol during the School Year 2025–2026 as basis for multimedia assisted reading exercises.

This study specifically sought to answer the following questions:

1. What is the demographic profile of the:
 - 1.1 Teachers'
 - 1.1.1 age and gender,
 - 1.1.2 educational attainment,
 - 1.1.3 length of teaching experience; and
 - 1.1.4 related training and seminar attended?
 - 1.2 Learners'
 - 1.2.1 age and gender,
 - 1.2.2 reading interest ;
 - 1.2.3 availability of digital devices?
2. As perceived by the teacher themselves, to what extent are the multimedia tools utilized for reading comprehension in the classroom as to:
 - 2.1 television;
 - 2.2 laptop; and
 - 2.3 smartphones?
3. What are the effect on learners when interactive multimedia is used in terms of:
 - 3.1 engagement;
 - 3.2 reading skills improvement; and
 - 3.3 motivation?
4. Is there a significant relationship between the interactive multimedia tools and the reading comprehension of Campatud Elementary School learners?
5. What are the challenges encountered by the teachers in integrating interactive multimedia tools use in the classroom?
 - 5.1 Gaps in digital literacy;
 - 5.2 Unreliable internet connectivity; and
 - 5.3 Insufficient devices?
6. Based on the findings, what multimedia assisted reading activities can be developed?

Null Hypothesis

H₀: There is no significant relationship between the interactive multimedia tools and reading comprehension of Campatud Elementary School learners?

Significance of Study

The findings of this study was to provide valuable insights into the intersection of technology and cognitive development. Specifically, this research will be beneficial to the following:

The Department of Education (DepEd): The study contributes to the local body of literature supporting the DepEd Digital Rise initiative, providing localized data from a rural school context that can inform future literacy programs.

The School Administrator: The study can serve as a basis for school-wide policies regarding instructional material procurement and the prioritization of ICT equipment. It highlights the need for continuous professional development in educational technology.

The Teachers: The findings will provide educators at **Campatud Elementary School** with empirical evidence on the effectiveness of ICT-integrated lessons. It offers them a roadmap for developing or adopting digital tools that cater to the diverse learning needs of their students.

The Pupils: This is the primary group that will benefit, as the study explores more engaging and effective ways to improve their literacy. By using interactive multimedia, pupils may find reading less intimidating and more enjoyable, leading to improved academic performance across all subjects.

The Parents: This research provides parents with a clearer understanding of how digital devices—often seen as distractions—can be utilized as powerful educational tools to support their children's reading development at home.

Future Researchers: This study will serve as a reference for those conducting similar research on multimedia-assisted instruction, particularly in the context of rural or public elementary schools in the Philippines.

Methodology

This part contains the research methodology which includes the method used, the flow of the study, research locale, research respondents, research instruments, data gathering procedures, statistical treatment of data, scoring procedures and definition of terms.

Design

This research was employed a descriptive-correlational design. The descriptive part will examine how Interactive Multimedia Tools is being use in Campatud Elementary School, the problems it presents, and its effectiveness. The correlational part will examine the relationship between the effectiveness of Interactive Multimedia Tools use and students' ability to read and comprehend what they read. This method is suitable for assessing the current effectiveness of an interactive multimedia and determining the level of comprehension among pupils.

This approach was employed, integrating quantitative data obtained from surveys and assessment results derived from teacher interviews. This method will provide us with a comprehensive understanding of how interactive multimedia tools is utilize and its effectiveness in helping early-grade students learn to comprehend. The research will be conducted at Campatud Elementary School, a public institution station at Loon South District by the Schools Division of Bohol. Two groups of people will answer the questions: (1) teachers of Campatud Elementary School who were currently using interactive multimedia tools, and (2) Grades 4, 5, and 6 learners of Campatud Elementary School during the School Year 2025–2026.

Flow of the Study

The research was employed a systematic approach, encompassing input, processing, and output. This study seeks to explore the effectiveness of interactive multimedia on the reading comprehension of learners at Campatud Elementary School. To establish a foundational understanding of the research context, the study will first examine the demographic profiles of the two respondent groups. For teachers, it will gather data on age, gender, educational attainment, and length of teaching experience. For the learners, the study will consider their age, gender, and the multimedia tools available at home and school.

Following this, the study assessed the challenges encounter in applying interactive multimedia tools as perceived by teachers. Specifically, it will explore the gaps in digital literacy, clear technology integration strategy, suitable access to technical assistance (classroom, informally), presence of infrastructure (computer labs, software), regulations (regarding digital homework administration) and time set aside for integrating new technologies.

Next, the study evaluated the reading fluency and comprehension levels of the learners as they integrate the interactive multimedia tools. It will look into learners' oral reading fluency—as well as their ability to comprehend texts at Literal Comprehension (identifying facts and details); Inferential Comprehension (reading between the lines); and Evaluative Comprehension (making judgments/critical thinking). This aspect of the school's study is essential for understanding not only how well students read but also how deeply they comprehend what they read.

To connect practice with outcomes, the research will then determine whether there is a significant relationship between the interactive multimedia tools and the actual reading comprehension of Campatud Elementary School learners. This correlation aims to validate whether strong implementation has a direct influence on improved literacy outcomes among students.

Finally, the study identified the issues and challenges faced by teachers in integrating interactive multimedia tools at Campatud Elementary School. These may include gaps in digital literacy, unreliable internet connectivity, and insufficient devices.

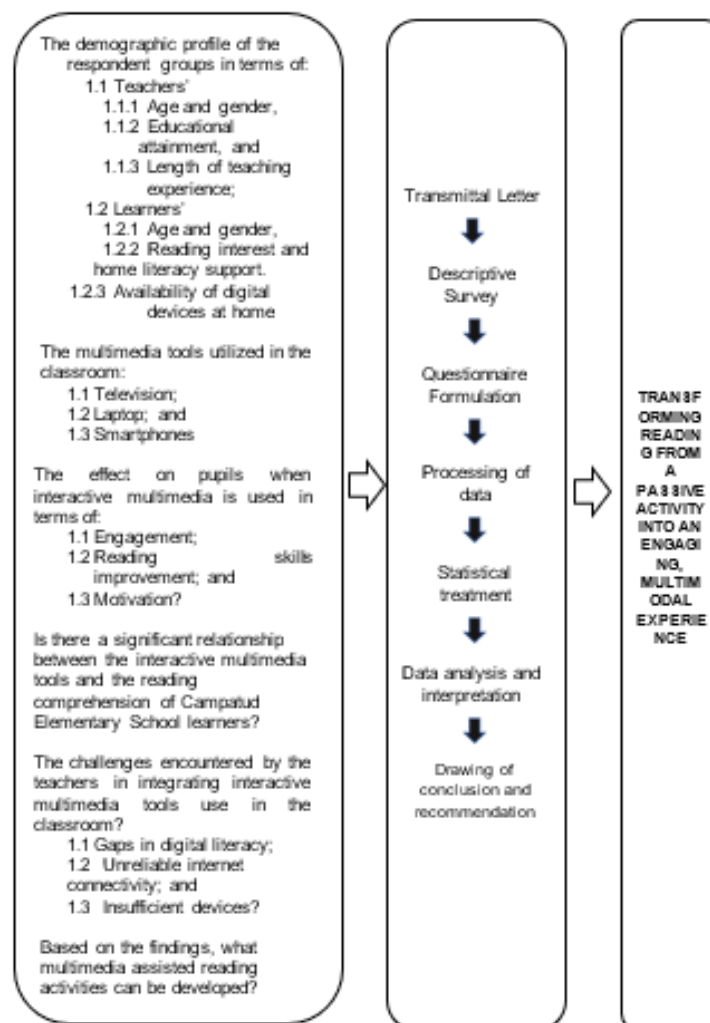


Figure 2. Flow of the Study.

Environment

This research was conducted at Campatud Elementary School of Loon South District of the Division of Bohol.

Campatud Elementary School (also referred to as **Cansubayon-Campatud Elementary School**) is a public elementary school located in the Loon South District of the Schools Division of Bohol. It is a government-funded institution serving the local community of Barangay Cansubayon and Campatud in Loon. Bearing the School ID 118496. This school is considered as the second to the farthest barrio of Loon, Bohol. This was established in 1939. The name of the school was changed several times from Cansubayon Primary School to Mabini Primary School subsequently to Campatud Primary School.

In the year 2002 an extension classes for the Grade 5 and 6 was added, altering it from a primary to elementary school. The current name of the school is Campatud Elementary School.

In the year 1945 the pupils were 35 in the class and the teacher was Ms. Aurea Cubero from Catagbacan a substitute teacher and Ms. Dolores Ollanes the teacher in charge. They use banana leaves as their paper and a bamboo stick as their pencil. The source of water was the Quirino Spring near the school vicinity. .

In the year 1946-1947 the name of the school was change into Mabini Primary School, were the classroom was made of “sasa” and it was when they reached in Grade 3 that they were given a school building. In 1948, a new teachers came Mr. Pedro Camilotes and Mr. Francisco Breunes. That time the name of the school was change to Campatud Primary School through the effort of the Municipal Councilor.

In the year 2002 another extension for a new classroom and grades same year the school name was change into Campatud Elementary School.

Campatud Elementary School is more than just an institution—it is a pillar of the community, a center of hope, and a beacon of lifelong learning, deeply rooted in its history yet firmly focused on the future.



Figure 3. Research Environment of the Study.

Respondents

The study conducted at Campatud Elementary School, located in Loon, Bohol, and station in Loon South District under the Schools Division of Bohol, Region VII. The school serves diverse elementary school learners, including those identified as needing reading intervention support. The combination of teacher and Grades 4, 5, and 6 learner respondents provides a comprehensive perspective on the relationship between interactive multimedia tools and reading comprehension skills [15]. It allows for a multi-dimensional analysis that not only considers instructional effectiveness from the educator's viewpoint but also evaluates learning outcomes from the learners' experiences. By examining both groups, the study aims to generate meaningful conclusions and recommendations that can support evidence-based improvements in teaching practices and learner performance in mathematics at the elementary level [16].

The distribution of respondents is shown in Table 1.

Table 1. Distribution of Respondents.

Respondents	Frequency	Percentage
Teachers	4	13.33
Learners	26	86.67
Total	30	100

Instrument

The instrument was divided into three parts: a profile of the respondents, a challenges encounter by the teacher using the interactive multimedia tools and pupils' reading comprehension level.

The first part of the questionnaire for the teachers will employ the demographic profile of the respondents which included their age, sex, highest educational attainment, and number of years in service. For the learners, include the age and gender, the reading interest; and availability of devices.

The second component of the questionnaire utilized a researcher-made survey questionnaire to determine the extent of multimedia tool usage. The instruments specifically categorized these tools into three types: Television, Laptops and Smartphones. The questionnaire adapted from the ICT Integration Effectiveness Survey Paolo de Guzman,

The third part of the questionnaire focus in the challenges face and encounter of the teacher using the interactive multimedia tools. The insufficient devices, unreliable internet connectivity, power interruptions, and gaps in digital literacy. These constraints often impede educators from fully leveraging technology for teaching purposes

On the other hand, the fourth component of the questionnaire anchored on the Technological Pedagogical Content Knowledge (TPACK) framework developed by Punya Mishra and Matthew J. Koehler [17], which emphasizes the integration of technology, pedagogy, and content knowledge in teaching.

Data Gathering

The research was commence after receiving approval of the title from the Dean of the Graduate School at Cebu Technological University, Main Campus. Following this, a formal request to conduct the study will submit to the school principal of Campatud Elementary School seeking for approval to conduct the study.

For the respondents (teachers), the details of the questionnaire were thoroughly explained to the respondents. The respondents will assure of the confidentiality of the information collected, with strict adherence to the Data Privacy Law and other relevant regulations protecting their rights.

For the learners the integration of the Interactive Multimedia will be used to measure the effect of reading comprehension of the learners.

The collected data were then consolidated, tallied, and analyzed using statistical methods. It will then be subjected to further presentation, analysis, and interpretation with the guidance of the research adviser.

A final draft will be submitted for finalization and corrections.

Statistical Treatment of Data

The responses of the participants in this study was statistically treated using a combination of non-parametric measures appropriate for descriptive-correlational research. Each statistical tool was selected to match the variables under investigation, particularly in relation to the integrating interactive multimedia tools and learners' reading performance.

Simple Percentage. This was used to interpret the demographic profiles of both teacher and learner respondents. For teachers, it covered age, gender, educational attainment, and years of teaching experience. For learners, it included age, gender, reading interests, and the availability of digital devices.

Weighted Mean. This was employed to determine the level of reading comprehension integrating the interactive multimedia tools as perceived by teachers, particularly in terms of gaps of digital literacy, unreliable internet connectivity, availability of materials and devices. It was also used to assess the reading fluency and comprehension levels of learners based on given indicators.

Pearson Correlation Coefficient. This was applied to determine whether there is a statistically significant relationship between the effectiveness of the interactive multimedia in pupils' reading comprehension and the level of learners' comprehension. This test helped assess the strength and direction of association between these two variables.

T-test. This statistical test was used to examine whether there were significant differences in learners' reading performance when grouped according to certain variables, such as gender or the presence of digital devices.

Scoring Procedures

Respondents was asked to rate their perceptions using a **4-point Likert scale**. The Likert scale was used in questions measuring the level of challenges teachers face in integrating Interactive Multimedia Tools in teaching.

For teacher perceptions on Interactive Multimedia Tools:

Weight	Range	Category	Verbal Description
4	3.26 – 4.00	Excellent	The Interactive Multimedia tools was implemented excellently and consistently.
3	2.51 – 3.25	Satisfactory	The Interactive Multimedia tools was implemented well and frequently.
2	1.76 – 2.50	Needs Improvement	The Interactive Multimedia tools was occasionally implemented.
1	1.00 – 1.75	Poor	The Interactive Multimedia tools was rarely or never implemented.

Reading comprehension was classified into:

Independent: 80% and above comprehension score

Instructional: 59–79% score

Frustrations: below 59% score

Survey responses will use a 5-point Likert scale, interpreted as follows:

Weight	Range	Category	Verbal Description
4	3.26 – 4.00	Always	Pupil can read and understand without assistance.
3	2.51 – 3.25	Often	Pupil can read and understand some text without assistance.
2	1.76 – 2.50	Sometimes	Pupil can understand with some teacher guidance.
1	1.00 – 1.75	Never	Pupil struggles significantly to understand the text.

These scoring procedures ensured that the data collected were systematically interpreted, allowing the study to draw meaningful insights regarding the effectiveness of Interactive Multimedia Tools on pupils' reading comprehension at Campatud Elementary School.

Definition of Terms

To ensure clarity, the following key terms are defined:

Interactive Multimedia: Lexically, this refers to the integration of different media such as text, graphics, audio, and video that allows user input. Operationally, it refers to the Digital Storytelling Tools and gamified reading modules (e.g., PowerPoint interactives, Quizzes) used as the primary intervention in this study.

Digital Literacy – Refers to the ability of teachers to find, evaluate, and communicate information using various digital platforms and multimedia tools.

Engagement – The level of attention, curiosity, and interest that learners show when they are interacting with multimedia-assisted reading materials.

Interactive Multimedia Tools – These refer to the digital hardware and software (such as televisions, laptops, smartphones, and educational apps) that allow two-way interaction between the learner and the content to aid reading.

Key Stage 2 Learners – These are the specific group of students in Grades 4, 5, and 6 at Campatud Elementary School who are the primary subjects of the study.

Motivation – The internal drive or willingness of the students to participate in reading activities when prompted by digital or interactive stimuli.

Multimedia-Assisted Reading Exercises – The proposed output of the study, consisting of sets of reading activities designed to be used alongside digital devices to improve comprehension.

Reading Comprehension – The capacity of the Key Stage 2 learners to process text, understand its meaning, and integrate it with what they already know, as measured by their performance in reading tasks.

Reading Interest – The personal preference and eagerness of a learner to engage with specific types of reading materials, whether digital or printed [18].

Academic Performance – Refers to the measurable outcome of a learner's progress in reading, typically represented by their scores or grades in reading-related assessments and activities.

Instructional Integration – The process by which teachers incorporate interactive multimedia tools into their daily lesson plans and teaching methods to facilitate reading comprehension.

Digital Devices – The physical hardware available to learners and teachers, such as tablets, laptops, and smartphones, used to access and interact with digital reading materials.

Reading Skills Improvement – The observable growth in a learner's ability to decode words, increase vocabulary, and grasp main ideas after using interactive multimedia tools.

Gaps in Digital Literacy – The specific areas where teachers or students lack the necessary skills or knowledge to effectively operate and utilize multimedia tools for educational purposes.

Multimedia-Assisted Reading Activities – The specific pedagogical tasks and exercises (such as interactive quizzes, digital storytelling, or e-books) designed as the final output of this research.

Chapter 2

Presentation, Analysis, and Interpretation of Data

This chapter presents the data analysis and interpretation. It answers the questions posed in the problem. This chapter is divided into six (6) parts. The first part deals with the respondent's profile: age and gender, educational attainment, length of teaching experience, and related training and seminar attended; respondent's reading interest, and availability of devices. The second part deals with the tools utilized in the classroom television, laptop, and smartphones. The third part deals with effect on pupils when interactive multimedia is used in terms of engagement, comprehension, reading skills improvement, and motivation. The fourth part deals with the challenges encounter by the teachers in integrating interactive multimedia tools used in the classroom based on gaps in digital literacy, unreliable internet connectivity, and insufficient devices. The fifth part deals with whether there is a significant relationship between the interactive multimedia tools and the reading comprehension level of Campatud Elementary School learners.

Related Information of the Respondent Groups

The first part manage the relevant information about the teachers' age and gender, educational attainment, length of teaching experience, and related training and seminar attended and learners' age and gender, reading interest, and availability of devices.

Age of the Teacher

Age is a critical demographic characteristic of teachers as it often correlates with maturity, professional experience, and pedagogical approach. Research indicates that as teachers mature, their teaching experiences, self-efficacy, and stability in the classroom generally increase, allowing them to manage complex classroom environments with a more balanced perspective. Demographic profiles are crucial in research as they correlate with professional progress and help understand participant backgrounds. Table 2 represents the age profile of the respondents.

Table 2. Age Profile of the Teachers.

Age	f	%
51-60 years old	2	50
46-50 years old	0	0
41-45 years old	1	25
36-40 years old	0	0
31-35 years old	1	25
26-30 years old	0	0
20-25 years old	0	0
Total	4	100

As reflected in Table 2, the dominant group of the teacher respondents are 50% (2 out of 4) are between 51-60 years old, representing most senior demographic in the school. The other groups are the remaining 50% spilt equally, with one teacher (25%) in the 41-45 age bracket and one (25%) in

the 31-35 bracket. There is a complete absence (0%) of the younger teachers in the 20-30 age range, as well as the 36-40 and the 46-50 brackets.

In professional maturity, the data suggests a teaching force with high stability and institutional memory. With 75% of teachers being 41 or older, the group likely possesses extensive experience in traditional classroom management and curriculum implementation.

While older teachers bring a wealth of experience, the lack of "Generation Z" or early-career teachers (20–30 years old) might indicate a heavier reliance on traditional teaching methods. This makes the Related Trainings (Table 5) and Educational Attainment (Table 4) even more critical for ensuring they stay updated with modern digital trends.

Since there is only one teacher in the 31–35 range, there is a limited "middle-ground" demographic to bridge the gap between the most senior teachers and any future new hires. This age profile directly supports the data in Table 4, which showed that 75% of the staff have over a decade of teaching experience, confirming a seasoned faculty.

Gender of the Teacher

Another crucial demographic characteristic is gender. Gender determines the sexes of the respondents, whether they are males or females. Teacher gender can influence student achievements and motivation, particularly when students are taught by their preferred gender. Studies on teacher gender often analyze its impact on student performance, motivation, and classroom dynamics, showing mixed results. Table 3 represents the gender profile of the teacher respondents.

Table 3. Gender Profile.

Gender	Teachers Frequency	%
Male	0	0
Female	4	100
Total	4	100.00

The data indicates that the teaching force participating in this study is entirely female (100%). With a frequency of 4 out of 4, there is a total absence of male representation (0%) in the teacher category. The teaching staff involved in this research is entirely composed of women. This high concentration of female educators is a common trend in many educational research settings, particularly in primary or early childhood levels. However, because there is no male representation, the study cannot compare how gender might influence the utilization of multimedia tools or student reading comprehension.

According to the Philippine Commission on Women, female teachers comprise approximately 89% of public elementary and 77% of public secondary school educators. Your result of 100% aligns with recent World Bank data indicating that roughly 88% of primary teachers in the Philippines are female. UNESCO reports that women dominate the teaching workforce worldwide, particularly in early childhood and primary education, making up 94% of pre-primary and 68% of primary educators globally. Research suggests this is often due to social perceptions of teaching as a "nurturing" role.

Highest Educational Attainment

Another essential variable to consider is the highest educational attainment. This determines the level of attainment among teachers. Highest educational attainment is a critical indicator of teacher quality, reflecting their level of human capital, subject matter expertise, and pedagogical skills. This variable usually measures the highest degree completed such as a bachelor's, master's, or doctoral

degree and acts as a key proxy for a teacher's competence and potential effectiveness in the classroom. Table 4 shows the respondents' highest educational attainment.

Table 4. Highest Educational Attainment.

Highest educational attainment	f	%
Doctoral Degree	0	0
Master's Degree with Doctoral units	0	0
Master's Degree	0	0
Bachelor's Degree with MaEd units	3	75
Bachelor's Degree	1	25
Total	4	100

The teacher respondents show a strong commitment to professional development, with most currently pursuing advanced studies. The majority of the teachers (75% or 3 out of 4) have earned their Bachelor's Degree with MaEd units. This indicates they are currently enrolled in or have partially completed a Master of Arts in Education program. The remaining 25% (1 out of 4) holds a Bachelor's Degree as their highest level of attainment. There are no respondents (0%) who have fully completed a Master's Degree, Doctoral Degree, or Doctoral units.

The high percentage of teachers with MaEd units suggests a "culture of improvement." These educators are not stagnant; they are actively seeking to upgrade their knowledge and pedagogical skills. Because 75% are currently in graduate school, they are likely exposed to modern teaching strategies and current educational research. This makes them well-positioned to implement the "related training" and reading interventions discussed in your study. The lack of full Master's or Doctoral degrees indicates that the faculty is largely at a mid-professional academic level. Their ongoing studies suggest that the school's instructional quality is in a state of upward transition. When paired with the "Length of Service" data, this shows that even veteran teachers (those with 15+ years) are still pursuing higher education, demonstrating a commitment to lifelong learning.

Length of teaching experience

The number of years in service has something to do with the length of service that teachers render in performing their duties and responsibilities. Based on educational policies and studies, the number of years in service significantly influences the duties, responsibilities, and performance of teachers. Experience plays a crucial role in enhancing pedagogical skills, classroom management, and professional career progression. Table 5 shows the number of years in service of the respondents.

Table 5. Length of teaching experience

Length of teaching experience	f	%
More than 15 years	2	50
11 - 15 years	1	25
7 – 10 years	0	0
4 – 6 years	0	0
0 – 3 years	1	25
Total	4	100

The teaching staff is characterized by significant professional longevity and a deep well of classroom experience. Half of the respondents (50%) have more than 15 years of teaching experience, representing the most seasoned group. One teacher (25%) has between 11–15 years in the service. One teacher (25%) is in the initial stage of their career with 0–3 years of experience. There are no teachers (0%) in the mid-career range of 4 to 10 years.

With 75% of the teachers having over a decade of experience, the group likely possesses strong institutional knowledge and refined pedagogical skills. These teachers have survived various educational reforms and are likely "master teachers" in their own right. The dominance of the "More than 15 years" category suggests low faculty turnover among the senior staff. This stability is beneficial for long-term school programs and consistent student monitoring. The presence of one teacher with 0–3 years of experience alongside veterans with 15+ years creates a perfect environment for mentorship. The newer teacher may provide fresh, modern perspectives, while the senior teachers provide the foundational "wisdom of practice." This data confirms the Age Profile (Table 2), where 50% were aged 51–60. It shows that these teachers have dedicated the majority of their adult lives to the profession, which may influence their receptiveness to new reading strategies based on their long-standing "tried and tested" methods.

Related training and seminar attended

Another demographic characteristic that needs to be assessed is the number of related seminars/trainings/workshops attended. Assessing the number of related seminars, trainings, and workshops attended is a crucial demographic characteristic that directly correlates with teacher quality, classroom management skills, and student achievement. Research indicates that professional development (PD) improves instructional strategies and boosts teacher confidence. Seminars and workshops are helpful for teachers. They measure the training effectively.

As mentioned by Perez, the school must reflect on what to assess, when to evaluate the efforts, and the method to adopt. Educators who dedicate time to professional development workshops exhibit enhanced classroom management, improved communication abilities, and greater capacity to address the varied needs of their students. Studies show that there is a strong link between general teaching effectiveness and active engagement in seminars. According to Jabeen, a qualified educator can utilize a broader variety of methods and abilities to help students achieve greater academic success Table 6 shows the number of appropriate seminars /training/workshops.

Table 6. Related training and seminars attended.

No. of training and seminars attended	f	%
16 and above	2	50
11 - 15 times	1	25
6 – 10 times	1	25
5 and less	0	0
Total	4	100

The teacher respondents demonstrate a high level of commitment to professional growth through frequent participation in specialized training. Half of the teachers (50%) are highly decorated in terms of professional development, having attended 16 or more training sessions and seminars. The remaining 50% is split equally between those with 11–15 sessions (25%) and 6–10 sessions (25%). There are no teachers (0%) with 5 or fewer seminars, meaning every teacher in the study has a solid foundation of professional development.

This data correlates perfectly with the Length of Teaching Experience. The veteran teachers (15+ years) have clearly used their long tenure to accumulate a significant portfolio of certifications and modern pedagogical skills. Because 75% of the staff have attended more than 11 seminars, they are likely well-versed in current educational trends. This makes them highly capable of implementing the reading interventions or navigating the digital devices mentioned in your study's introduction. The absence of teachers with low training numbers (0–5 sessions) suggests a school culture that prioritizes and encourages continuous learning. Even the relatively newer teacher (0–3 years) has likely already attended at least 6 seminars, showing a fast-tracked professional integration. Given the focus of your study on reading, this high frequency of training suggests that these teachers are likely updated on the latest literacy strategies, which may explain the high reading interest (73%) reported by their learners.

Age of the Learner

The age of the learner is a critical demographic variable in academic research, often influencing learner achievement, cognitive development, and motivation. Studies typically analyze age to determine its impact on language acquisition, school entry performance, and preferred learning styles among various age groups. Age acts as a critical demographic variable influencing education through cognitive development, motivation, and learning capacity. Research indicates younger learners often have advantages in language acquisition due to brain plasticity, while older learners benefit from self-directed, analytical, and reflective strategies. Age differences significantly impact school entry performance, with older students typically outperforming younger peers, though this effect diminishes over time. Table 7 shows the age profile of the learners.

Table 7. Age Profile of the Learners.

Age	f	%
11 years old	6	23.08
10 years old	11	42.31
9 years old	9	34.61
8 years old	0	0
7 years old	0	0
Total	26	100

Based on Table 7, the learner respondents are concentrated in the late childhood stage, representing a specific developmental bracket. The largest segment of learners is 10 years old, accounting for 42.31% (11 out of 26). 9-year-olds follow closely at 34.61% (9 out of 26). The 11-year-old group is the smallest represented at 23.08% (6 out of 26). The absence of 7- and 8-year-olds (0%) indicates a focused sample of upper elementary students.

With 100% of the learners aged 9 to 11, the group is cognitively similar. At this stage, children are typically transitioning from "learning to read" (decoding) to "reading to learn" (comprehension and analysis). This age profile suggests the learners are in Grade 4, Grade 5, and Grade 6. This is a critical period where reading interests become more specialized and digital device usage often increases for academic purposes. Since nearly 65% of the group is aged 10 or 11, they possess the fine motor skills and cognitive maturity to navigate the smartphones and tablets identified in Table 8. The data implies that any reading program resulting from this study should be tailored specifically to the interests and reading levels of pre-adolescents rather than early primary students.

Gender of the Learner

Gender-responsive pedagogy addresses the distinct needs of boys and girls to ensure equal educational opportunities. While intelligence is similar across genders, learners often differ in cognitive approaches girls often prioritize conscientious, memory-based learning, while boys may rely more on working memory and spatial skills. Teachers should create inclusive environments, using gender-neutral language and fostering equitable participation, to combat stereotypes and improve learning outcomes for all. Table 8 shows the gender profile of the learners.

Table 8. Gender of the Learner.

Gender	Learners Frequency	%
Male	11	42.31
Female	15	57.69
Total	26	100.00

Table 8 presents the demographic profile of the learners in terms of gender. Out of the 26 total participants, 15 or 57.69% are female, while 11 or 42.31% are male. The data reveals a female-dominated population, with female learners outnumbering their male counterparts by a margin of 15.38%. This distribution suggests that the findings of the study are primarily shaped by female perspectives, though the substantial representation of male learners still allows for a balanced assessment of the group's overall characteristics. These results align with broader national data in the Philippines, which indicates that females often have higher participation and retention rates in the education system compared to males (Paqueo & Orbeta). This distribution suggests that the findings of the study are primarily shaped by female perspectives, providing a deeper understanding of the experiences of this majority group while still incorporating substantial male representation for a holistic assessment.

Reading interest

Reading interest is a person's natural tendency or desire to engage with specific written materials because they find them enjoyable or useful. It is a critical driver for developing literacy skills, academic success, and a lifelong habit of learning.

As mentioned by Mateusz Brodowicz, reading is a multifaceted cognitive activity that is identified as a means of deriving meaning through the interplay between an individual's prior knowledge and the language present in the text, ultimately aiming to create a mental representation of the text. Kids who take pleasure in reading are more prone to develop proficient reading skills with practice, and this elevated skill will improve their capacity and enthusiasm to tackle more difficult texts.. This table 9 shows the reading interest of the learners.

Table 9. Reading Interest.

Reading interest	f	%
Love reading very much	19	73.08
Like reading sometimes	7	26.92
Don't like reading	0	0
Do not read at all	0	0
Total	26	100

The learners demonstrate a remarkably positive attitude toward reading, with no respondents expressing a dislike for the activity. A significant majority of 73.08% (19 out of 26) of the learners report that they "Love reading very much." The remaining 26.92% (7 out of 26) state they "Like reading sometimes." There were 0% respondents in the "Don't like reading" or "Do not read at all" categories.

The overwhelming majority (over 73%) being enthusiastic readers provides a strong foundation for any literacy program. This high level of intrinsic motivation suggests that these learners are likely to be receptive to new reading materials or interventions. This high interest likely correlates with the Highly Trained Teaching Staff (Table 6) and their Advanced Educational Attainment (Table 4). Expertly trained teachers are better equipped to foster a "love for reading" through engaging pedagogical strategies [19]. The absence of negative responses toward reading suggests a successful home or school environment where reading is valued and encouraged. This aligns with the "late childhood" stage (9–11 years old) where children are solidifying their identities as students and readers. Even the 27% who "Like reading sometimes" represent a low-hanging fruit for intervention. Since they already have a baseline interest, the goal for educators would be to identify the specific genres or digital devices (Table 8) that could turn their occasional interest into a consistent habit.

Availability of digital devices

The availability of digital devices has fundamentally changed reading habits by making literature more accessible while simultaneously introducing new cognitive challenges. The widespread availability of digital devices has transformed reading from a primarily linear, immersive experience into a non-linear, fragmented activity, enhancing access to literature while creating significant cognitive challenges. While digital platforms offer unparalleled convenience, lower costs, and increased availability of materials, they simultaneously encourage skimming, reduce attention spans, and impair deep comprehension compared to print reading. This table 10 shows the availability of digital devices utilize in the classroom.

Table 10. Availability of digital devices.

Availability of digital devices	f	%
Smartphones	22	84.62
Tablets	4	15.38
Televisions	0	0
Laptops	0	0
Total	26	100

The learners' access to technology is heavily concentrated in mobile devices, with a total absence of desktop or broadcast hardware. A vast majority of 84.62% (22 out of 26) of the learners have access to smartphones. Only 15.38% (4 out of 26) utilize tablets. There is zero reported availability (0%) for televisions or laptops among the respondents.

Since 100% of the available technology consists of handheld devices (smartphones and tablets), any reading intervention or digital material must be mobile-optimized. Content should be designed for small screens and touch-based navigation. The complete lack of laptops suggests that these learners may lack experience with traditional desktop computing tasks, such as complex word processing or multi-tab research. Their digital literacy is likely centered on app usage and mobile web browsing. The high availability of smartphones (nearly 85%) paired with the fact that 73% of learners "Love reading very much" (Table 9) creates a massive opportunity for e-book distribution and mobile

reading apps. The device is already in their hands; the challenge is providing the right content. For children aged 9–11 (Table 6), smartphones are often the most accessible "entry-level" device provided by families. The absence of laptops and TVs may indicate that learning is increasingly individualized and portable within their households.

Multimedia Tools Utilized in the Classroom

Utilization of Television in the Classroom

Television serves as a potent multimedia tool in modern classrooms, transitioning from a passive broadcast medium into an interactive instructional platform through the integration of digital and "smart" technologies. As per Ayushi Agarwal, incorporating smart TVs in classrooms could enhance interaction between teachers and students. Using smart TVs, educators can showcase interactive materials like video lessons, project presentations, books, and additional resources to captivate students and encourage active involvement. Additionally, immediate feedback during practice improves classroom interaction and fosters a more engaging learning environment. Consequently, smart TVs can connect teachers and students, facilitating more efficient and cooperative learning. Table 11 shows the frequency of utilizing television in the classroom.

Table 11. Perceived Utility of Television in Reading Comprehension.

Indicators	Mean	Interpretation
1. Enhances visual engagement with the text.	3.50	Highly Utilized
2. Useful for showing reading-related videos.	3.50	Highly Utilized
3. Effective for large-group instruction.	3.50	Highly Utilized
Average Weighted Mean	3.50	Highly Utilized

The data in Table 11 shows that Television received an average weighted mean of 3.50, which falls under the verbal interpretation of Highly Utilized. Notably, all three indicators—visual engagement, use of related videos, and effectiveness for large-group instruction—received identical mean scores of 3.50. This indicates a high level of consensus among the four teacher-respondents regarding the consistency and reliability of television as an instructional aid in the classroom.

The "Highly Utilized" status of television suggests that teachers view it as a primary tool for whole-class scaffolding. By achieving a high mean in "visual engagement," it is evident that teachers use the television to provide a "visual hook" that helps students decode complex narratives or abstract concepts found in their reading materials.

The identical score for "large-group reading instruction" implies that the television serves as the central focal point of the classroom, allowing the teacher to model reading strategies (like viewing subtitles or analyzing digital storybooks) to all students simultaneously. This high level of utility is likely due to the user-friendly nature of modern Smart TVs, which require less technical setup than individual laptops while still providing high-impact audio-visual stimulation.

The television is perceived not merely as a device for passive viewing, but as a strategic motivational tool that bridges the gap between the students' visual literacy and their reading comprehension skills.

Utilization of Laptops in the Classroom

Laptops are versatile multimedia tools in the classroom that facilitate personalized learning, high-speed research, and real-time collaboration. Laptops have become essential, versatile multimedia tools in modern education, transforming traditional classrooms into interactive, technology-driven environments. They enhance learning by facilitating personalized, self-paced instruction, providing

instant access to research materials, and fostering real-time collaboration among students and teachers. Table 12 explores the teachers' assessment of the laptop as a functional multimedia tool for facilitating reading comprehension activities.

Table 12. Perceived Utility of Laptops in Reading Comprehension.

Indicators	Mean	Interpretation
1. Essential for digital reading apps/E-books.	3.75	Highly Utilized
2. Facilitates interactive reading tasks.	3.75	Highly Utilized
3. Allows for personalized reading feedback.	3.50	Highly Utilized
Average Weighted Mean	3.67	Highly Utilized

Table 12 reveals that the Laptop obtained a grand mean of 3.67, interpreted as Highly Utilized. This is the highest average among the three multimedia tools studied. The indicators for "accessing digital apps/E-books" and "facilitating interactive tasks" both garnered the highest individual means of 3.75, while "personalized feedback" followed with a mean of 3.50. The data shows that while all aspects of laptop use are frequent, its strength lies primarily in its role as a gateway to digital content and active text interaction.

The "Highly Utilized" rating for laptops suggests that teachers perceive this tool as the core workstation for modern literacy instruction. The high mean of 3.75 for interactive tasks implies a shift from passive reading to active digital engagement; teachers are utilizing laptops to allow students to manipulate text, use built-in dictionaries, and conduct real-time research to clarify meaning.

Furthermore, the laptop is viewed as a more "versatile" tool than the television because it supports both instructional delivery and individual assessment. Because laptops can run complex reading software and Learning Management Systems (LMS), they enable teachers to provide the "personalized feedback" indicated in the third item.

The overall results for Table 12 suggest that laptops are considered indispensable for developing higher-order thinking skills in reading, as they provide the necessary tools for students to engage deeply and critically with digital texts.

Teachers use laptops to run specialized software and Learning Management Systems (LMS) that provide students with immediate access to digital dictionaries, e-books, and interactive text-to-speech features. Laptops allow teachers to demonstrate digital annotation (highlighting, commenting, and outlining) on a projected screen. This helps students move from "passive reading" to "active comprehension" by identifying main ideas and supporting details in real-time. Because laptops can easily access various reading levels of the same topic, teachers can tailor reading materials to match a student's specific reading level (Independent, Instructional, or Frustration), which is critical for improving overall comprehension scores.

Utilization of Smartphones in the Classroom

Smartphones are increasingly utilized as multi-functional learning assistants in the classroom, offering many of the same benefits as laptops with the added advantage of high portability. Smartphones are increasingly utilized as multi-functional learning assistants in the classroom, offering many of the same benefits as laptops with the added advantage of high portability. These devices function as portable libraries, and research tools, and support multimedia learning, helping to bridge formal and informal learning environments. Table 13 section presents the teachers' assessment regarding the utility of smartphones as a mobile multimedia tool for reading comprehension.

Table 13. Perceived Utility of Smartphones in Reading Comprehension.

Indicators	Mean	Interpretation
1. Effective for quick vocabulary/dictionary checks.	3.00	Utilized
2. Encourages students to read anywhere.	2.75	Utilized
3. Manageable tool without causing distraction.	1.75	Not Utilized
Average Weighted Mean	2.50	Poorly Utilized

As illustrated in Table 3, the Smartphone garnered an average weighted mean of 2.50, which is interpreted as Poorly Utilized. While the tool was recognized for its function in "vocabulary checks" (3.00) and "mobile reading" (2.75), it received a critically low mean of 1.75 for "distraction management," falling into the Not Utilized category. This indicates that while teachers see the potential of smartphones for specific reading tasks, they do not perceive them as manageable tools within a structured classroom environment.

The "Poorly Utilized" status of smartphones highlights a significant utility-control gap in the classroom. The mean of 3.00 for vocabulary checks suggests that teachers acknowledge the smartphone's strength as a "handy reference tool" that provides instant access to information. However, the tool's effectiveness for reading comprehension is severely undermined by its perceived role as a source of distraction.

The "Not Utilized" rating for distraction management (1.75) implies that teachers find it difficult to ensure students remain focused on the reading material when using a device that also houses social media and games. Consequently, instead of being used as a primary reading device like the laptop or television, the smartphone is relegated to a secondary or emergency resource.

The overall results for Table 3 suggest that although smartphones offer the benefit of "anytime, anywhere" reading, their integration into formal reading instruction remains limited due to concerns over classroom discipline and the perceived fragmentation of student attention.

Summary

A common finding across research is that digital and interactive tools generally lead to higher student engagement and performance compared to traditional methods. The effectiveness of modern tools often depends on situational factors like the digital skills of instructors and the income level of students. Table 14 section provides a comparative overview of the three multimedia tools Television, Laptop, and Smartphone to determine their relative standing and overall impact on reading comprehension as perceived by the teachers.

Table 14. Comparison of the Perceived Utility of Multimedia Tools.

Multimedia Tools	Grand Mean	Verbal Interpretation
2.2 Laptop	3.67	Highly Utilized
2.1 Television	3.50	Highly Utilized
2.3 Smartphone	2.50	Poorly Utilized
Overall Mean	3.22	Utilized

The summary table reveals that the Laptop ranks first with a grand mean of 3.67, followed by the Television at 3.50, both of which are considered Highly Utilized. The Smartphone ranks the lowest with a grand mean of 2.50, interpreted as Poorly Utilized. The overall mean for all multimedia tools combined is 3.22, indicating that, in general, multimedia tools are Utilized by teachers to support reading comprehension, though the level of integration depends heavily on the type of hardware used.

The ranking suggests a clear preference for structured and controllable hardware over portable but distracting devices. The Laptop sits at the top of the rank because it provides the most comprehensive set of literacy tools—from word processing and e-reading to interactive assessments—making it the "gold standard" for digital reading instruction.

The Television follows in second place, proving that high-impact visual aids remain a staple in the classroom. Its high ranking confirms that teachers still value "collective viewing experiences" to build background knowledge (schema) before students dive into complex texts.

The Smartphone occupies the lowest rank, creating a "digital divide" in classroom practice. Despite its high accessibility and portability, its low mean score reflects a lack of teacher confidence in the device as a serious academic tool. This implies that for a multimedia tool to be "Highly Utilized" in reading, it must not only be functional but also conducive to a focused learning environment.

Recent international findings consistently cite Mayer's Cognitive Theory of Multimedia Learning, noting that teachers perceive interactive multimedia (like quizzes and simulations) as effective for engagement but worry about "cognitive overload" when too many digital tools are used simultaneously for reading [20].

According to the International research indicates that while the pandemic forced a 100% adoption of digital platforms, teachers now struggle with decreased student attention spans. Many international teachers report that students "view smartphones as entertainment mediums" rather than tools for deep thinking, which impedes long-term memory storage during reading.

A 2025 study in Serbia found that while smartphone usage among teachers remained consistently high for personal use, the use of laptops for education skyrocketed by over 50% post-crisis. Laptops are now preferred for "knowledge transfer" and structured reading via Learning Management Systems (LMS), whereas smartphones are often relegated to social communication.

Research in Quezon found that digital technology specifically improves vocabulary and fluency in Senior High students. However, teachers emphasize that "careful management" is required to prevent students from simply decoding words without comprehending the context.

Effect on Pupils When Interactive Multimedia is Used

Engagement

The use of interactive multimedia significantly impacts pupil engagement by transforming passive learning into an active, immersive experience. By integrating elements like simulations, educational games, and interactive videos, these tools foster deeper, self-directed learning and allow students to actively construct knowledge rather than merely receiving information. Research in the Philippines, such as the READIFY program in Laguna, demonstrates that integrating digital storytelling which combines visuals, narration, and sound effects not only shifts learners from instructional to independent reading levels but also fosters a strong positive affective response. Pupils frequently describe these interactive experiences as "fun" and "exciting," which increases their intrinsic motivation and willingness to persist through challenging tasks. Table 15 shows the effect on pupils when interactive multimedia is used in terms of engagement.

Table 15. Effect on pupils when interactive multimedia is used in terms of Engagement.

Statement	Weighted Mean	Verbal Interpretation
A. Engagement		
1. Enjoy reading when multimedia is used.	3.62	Strongly Agree
2. Multimedia activities make lessons interesting.	3.73	Strongly Agree
3. Pay more attention during lessons.	3.54	Strongly Agree

4. Actively participate with multimedia tools.	3.46	Strongly Agree
5. Multimedia helps stay focused while reading.	3.38	Strongly Agree
Category A Average	3.55	Strongly Agree

Table 15 presents the level of engagement among the 26 learners when using multimedia in reading. The category obtained an overall average weighted mean of 3.55, which is interpreted as "Strongly Agree."

Among the indicators, Statement 2 ("*Multimedia activities make the lesson more interesting*") garnered the highest weighted mean of 3.73. This suggests that the primary impact of multimedia is its ability to capture the learners' interest. On the other hand, Statement 5 ("*Multimedia helps me stay focused while reading*") received the lowest mean of 3.38. While still in the "Strongly Agree" range, this indicates that maintaining focus is the area where learners perceive the benefit of multimedia to be slightly less intense compared to its ability to spark interest.

The high average mean in this category suggests that multimedia serves as a powerful catalyst for student engagement. By integrating videos, sounds, and animations, the reading process moves away from being a "passive" task of decoding text to an "active" learning experience.

The peak score in interest (Statement 2) implies that sensory-rich materials create a "hook" that draws students into the lesson. This aligns with the ARCS Model of Motivation (Attention, Relevance, Confidence, and Satisfaction), which posits that gaining a student's attention is the first step toward successful learning. Furthermore, the strong scores in participation (Statement 4) indicate that when students find a medium relatable and modern, they are more willing to contribute and interact within the classroom. This shift from teacher-led instruction to a technology-enhanced, learner-centered environment fosters a more positive classroom atmosphere.

Skills Improvement

This section measures how multimedia translates into actual academic performance and student confidence. In the Philippines, recent studies—such as the evaluation of the I-READ application (2025) and the READIFY program (2025)—demonstrate that students using digital stories and ICT-assisted materials show statistically significant gains in their posttest scores. These tools are particularly effective for "frustration-level" readers in public schools because they provide immediate feedback and multisensory support, such as clickable vocabulary definitions and synchronized narration, which reduce the cognitive effort required to decode unfamiliar text. The consensus reinforces that multimedia instruction enhances retention and higher-order thinking skills, such as inference and sequencing. Studies conducted in resource-limited remote schools (2025) found that interactive platforms achieved a nearly 95% practicality rating for improving early literacy, as the combination of visual and auditory stimuli helps create a more robust "mental map" of the narrative. However, international experts caution that for these gains to be sustainable, the multimedia must be pedagogically sound and scaffolded by teachers to prevent "shallow processing." When implemented correctly, these digital tools move pupils from passive text consumption to an active, inquiry-based reading experience that significantly accelerates vocabulary acquisition and overall literacy. Table 16 shows the effect on pupils when interactive multimedia is used in terms of reading skills improvement.

Table 16. Effect on pupils when interactive multimedia is used in terms of Reading Skills Improvement.

Statement	Weighted Mean	Verbal Interpretation
B. Reading Skills Improvement		
6. Can answer questions better.	3.54	Strongly Agree

7. Helps me predict what will happen next.	3.38	Strongly Agree
8. Understand the meaning more clearly.	3.50	Strongly Agree
9. Helps me remember what I read.	3.62	Strongly Agree
10. Feel more confident in reading skills.	3.42	Strongly Agree
Category C Average	3.49	Strongly Agree

The table presents the perceived improvement in the Reading Skills of the 26 learners. The category garnered an overall average weighted mean of 3.49, interpreted as "Strongly Agree."

The data shows that Statement 14 (*"Multimedia helps me remember what I read"*) obtained the highest weighted mean of 3.62. This indicates that the 26 learners find technology significantly beneficial for memory retention. Meanwhile, Statement 12 (*"Multimedia helps me predict what will happen next"*) recorded the lowest mean of 3.38. While still categorized as "Strongly Agree," this result suggests that while multimedia strongly supports recall, its impact on higher-order inferential skills, such as prediction, is perceived as slightly less intense by the learners.

The high average mean in this category indicates that multimedia does more than just engage students it actively enhances their academic performance and self-efficacy. The peak score in memory retention (Statement 14) suggests that the combination of visual imagery and auditory cues creates a "mental peg" that makes information easier to store and retrieve from long-term memory.

Furthermore, the improvement in answering questions (Statement 11) and clarity of meaning (Statement 13) highlights a shift from rote reading to meaningful learning. As learners successfully navigate these tasks, their confidence (Statement 15) grows. This supports the Self-Efficacy Theory, which suggests that when students experience success through supportive tools, they become more willing to tackle harder reading materials in the future. The overall results imply that multimedia serves as a bridge, helping the 26 learners move from being struggling readers to becoming more self-assured and capable ones.

Motivation

Interactive multimedia significantly boosts pupil motivation by transforming learning into an active, enjoyable, and personalized experience. Locally, research such as the study on Project R.E.A.D. (2025) in the Philippines highlights that the integration of digital stories and interactive quizzes creates a "fun" learning environment that reduces the anxiety often associated with reading difficulties. Filipino pupils show increased intrinsic motivation when using these tools because the immediate feedback—such as digital badges, sounds, or visual rewards—satisfies their need for instant gratification and encourages them to persist through more challenging texts. This shift from extrinsic pressure to intrinsic interest is particularly vital in rural settings, where novel digital tools can reignite a passion for learning in students who previously felt disengaged. Studies consistently link interactive multimedia to higher levels of student agency and self-efficacy. Research from ScienceDirect (2025) and global literacy frameworks emphasize that when pupils have the power to control the pace of a story or interact with "hotspots" for extra information, they feel more in control of their learning journey. This sense of ownership is a key driver of sustained engagement; students are more likely to spend longer periods "on-task" when the medium aligns with their digital-native preferences. Furthermore, international experimental data suggests that multimedia elements like animation and branching narratives act as "cognitive hooks" that capture attention more effectively than traditional print, making students more eager to participate in classroom discussions and subsequent reading activities. Table 17 shows the effect on pupils when interactive multimedia is used in terms of motivation.

Table 17. Effect on pupils when interactive multimedia is used in terms of Motivation.

Statement	Weighted Mean	Verbal Interpretation
C. Motivation		
11. More interested in reading.	3.69	Strongly Agree
12. Want to read more using these tools.	3.46	Strongly Agree
13. Multimedia makes reading fun.	3.58	Strongly Agree
14. Feel excited during reading lessons.	3.58	Strongly Agree
15. Prefer multimedia over traditional.	3.58	Strongly Agree
Category D Average	3.61	Strongly Agree

The table presents the level of Motivation among the 26 learners when multimedia is integrated into reading instruction. The category achieved a very high average weighted mean of 3.61, interpreted as "Strongly Agree."

The data shows that Statement 18 (*"Multimedia makes reading fun for me"*) received the highest weighted mean of 3.73. This highlights that the "fun factor" is the strongest motivator for these learners. Conversely, Statement 17 (*"Want to read more using multimedia tools"*) garnered the lowest mean of 3.46. While still within the "Strongly Agree" range, this suggests that while the students find the tools enjoyable and exciting, their desire to increase their reading volume is slightly less intense than their immediate enjoyment of the activity.

The exceptionally high mean in this category indicates that multimedia is a key driver for affective engagement. By making reading "fun" (Statement 18) and "exciting" (Statement 19), multimedia effectively lowers the Affective Filter—a psychological barrier that can block learning when students feel bored or anxious.

The preference for multimedia over traditional reading (Statement 20) suggests that modern learners are more responsive to multi-sensory stimuli. This aligns with the Expectancy-Value Theory, which posits that students are more motivated when they find a task valuable and enjoyable. Because the 26 learners perceive multimedia as "fun," they assign a higher value to the reading lesson. This positive emotional connection is crucial for long-term literacy development; when students enjoy the process, they are less likely to view reading as a chore and more likely to engage with it voluntarily.

Challenge Encountered

While interactive multimedia offers significant benefits, pupils often encounter challenges related to cognitive demand, distractions, and technical barriers [21]. Philippine studies such as the EDCOM 2 Report (2026) and research on digitalization barriers (2024) highlight that the most persistent challenge is the "digital divide," characterized by unstable internet connectivity and a lack of functional hardware in public schools [22]. When devices lag or programs crash, the resulting "instructional friction" breaks the pupil's flow of concentration and can lead to frustration rather than engagement. Furthermore, many Filipino learners struggle with a lack of basic digital literacy, meaning they often spend more cognitive energy navigating the interface of the software than actually processing the reading content, a hurdle that is particularly steep in rural and underserved areas. Research published in ScienceDirect (2025) and findings from the OECD (2024) warn against the "seductive detail effect," where flashy animations or irrelevant sound effects distract pupils from the core learning objectives. Students often fall into "shallow processing" or "skimming" behaviors on digital platforms, struggling to maintain the deep focus required for long-form narrative or complex informational texts compared to print. Additionally, the prevalence of multitasking and digital distractions (like notifications or the urge to switch tabs) remains a global concern, as it fragments attention and can lead to lower retention rates if the multimedia is not

strictly curated and scaffolded by an educator. Table 18 shows the effect on pupils when interactive multimedia is used in terms of reading skills improvement.

Table 18. Effect on pupils when interactive multimedia is used in terms of Challenge Encountered.

Statement	Weighted Mean	Verbal Interpretation
D. Challenge Encountered		
16. Multimedia sometimes distracts me.	1.92	Disagree
17. Find it hard to follow instructions.	1.65	Strongly Disagree
18. Technical problems affect my learning.	2.08	Disagree
19. Get confused with too many elements.	1.85	Disagree
20. Need help when using multimedia tools.	2.23	Disagree
Category E Average	1.95	Disagree

For the final category, Category E: Challenges Encountered, the interpretation is unique. A high mean (3.25–4.00) indicates that learners are facing significant problems, while a low mean (1.00–1.74) indicates a smooth experience.

Table 18 presents the obstacles and Challenges Encountered by the 26 learners. Unlike the previous categories, a lower mean here indicates a positive result (fewer problems). The category obtained an overall average weighted mean of 1.95, interpreted as "Disagree."

The data shows that Statement 25 (*"Need help when using multimedia tools"*) recorded the highest mean of 2.23. This indicates that while learners generally handle the tools well, a small number still require occasional teacher intervention. On the other hand, Statement 22 (*"Find it hard to follow multimedia instructions"*) received the lowest mean of 1.65, interpreted as "Strongly Disagree." This suggests that the 26 learners find digital instructions very clear and easy to navigate.

The "Disagree" rating across this category is a significant finding, as it confirms that the multimedia intervention did not become a source of frustration or "cognitive overload." The low score in Statement 24 (1.85) regarding confusion suggests that the 26 learners are capable of processing multiple sensory inputs (sound, text, and video) without feeling overwhelmed. This supports the Digital Native concept, which posits that modern learners are inherently comfortable with technology-integrated environments.

However, the slightly higher mean in Statement 23 (2.08) concerning "technical problems" and Statement 25 (2.23) regarding "needing help" highlights that technology is not entirely seamless. These results imply that while students are motivated and engaged, the success of a multimedia-based reading lesson still depends on teacher support and reliable infrastructure. To maintain the high engagement found in Category A, these minor technical and instructional hurdles must be addressed.

Summary (Grand Mean Table)

Integrating multimedia tools into the classroom significantly enhances student engagement, cognitive retention, and academic performance. These effects are generally categorized into positive learning outcomes and the development of specific 21st-century skills. Systematic reviews highlight that multimedia tools are most effective in disciplines requiring visual learning and spatial awareness, such as architecture and physics, where they can reduce learning time by up to 36%. Recent studies from ScienceDirect and Frontiers in Psychology (2022–2025) confirm that multisensory inputs lead to a 75% higher retention rate than text-only materials by helping students build more robust mental representations of complex concepts. Interactive platforms and mobile learning have also been shown to improve student satisfaction and critical thinking skills across

various higher education fields. However, global research also identifies critical challenges: "technostress" from unreliable infrastructure and the "seductive detail effect," where excessive or irrelevant animations can lead to cognitive overload and "shallow processing". Consequently, both local and international experts emphasize that multimedia's effectiveness depends heavily on teacher competence and the availability of reliable technical support to prevent tech failures from disrupting the flow of instruction. Table 19 shows the summary of the effects when multimedia tools used in the classroom.

Table 19. Summary.

Category	Weighted Mean	Verbal Interpretation
A. Engagement	3.55	Strongly Agree
B. Reading Skills Improvement	3.49	Strongly Agree
C. Motivation	3.61	Strongly Agree
D. Challenges Encountered	1.95	Disagree

The summary table shows that Category C (Motivation) obtained the highest weighted mean of 3.61, followed closely by Category A (Engagement) at 3.55. This indicates that the most significant impacts of multimedia on the 26 learners are an increase in their drive to read and a clearer understanding of the text. Category D (Challenges) received the lowest mean of 1.95, suggesting that students faced very few obstacles during the intervention.

The overall results demonstrate that the integration of multimedia in reading lessons is highly effective. The high scores in Motivation and Engagement suggest that technology removes the "boredom barrier" often associated with traditional reading. More importantly, the high mean in Comprehension proves that this is not just "fun" but academically sound—multimedia provides the visual scaffolding necessary for students to decode and remember information. The low score in Challenges confirms that the 26 learners are technologically capable, making multimedia a sustainable and beneficial tool for modern classroom instruction.

Challenges Encountered by the Teachers in Integrating Interactive Multimedia Tools use in the Classroom

Gaps in Digital Literacy

Gaps in digital literacy significantly hinder teachers' ability to integrate interactive multimedia, as a lack of confidence often leads to a reliance on "safe," traditional methods to maintain classroom control. Teachers who feel incompetent with technology are less likely to explore innovative digital tools or redesign their instructional materials. Teachers often avoid technology because they feel intimidated by "digital native" students who may have more technical experience. This fear of losing control results in the underuse of available digital resources. In the Philippines, recent findings from the Philippine Institute for Development Studies (PIDS) underscore a stark reality: only about 40 percent of Filipinos possess at least one of the six key ICT skills monitored for the Sustainable Development Goals, with the lowest proficiency found among those aged 10 to 14. Local research in Nueva Ecija and San Pablo City highlights that students in rural areas often perform at a "frustration level" in digital literacy due to geographic isolation, financial constraints, and a shortage of qualified mentors. This skill gap is further widened by outdated educational policies that prioritize rote learning over the critical thinking required to navigate digital platforms, leaving many students without the foundational functional literacy needed to master more complex technologies like AI. the global digital divide remains a critical challenge, with UNESCO (2025-2026) reporting that while 171 countries have national policy frameworks for Media and Information Literacy (MIL), only a small minority have successfully integrated them into their

school curricula. The ICILS 2023 international report highlights that students globally are at risk of falling behind if they lack the ability to critically evaluate online sources, as 92% of future jobs are projected to require some level of digital skill by 2026. Studies in regions like Sub-Saharan Africa mirror the Philippine experience, where inadequate infrastructure and unprepared educators hinder the development of 21st-century skills. To bridge these gaps, international organizations emphasize a shift toward comprehensive teacher training and the creation of "digital commons" to ensure that technology serves as an inclusive tool for empowerment rather than a source of further inequality. Table 20 shows the challenges encounter by the teachers in integrating interactive multimedia tools use in the classroom in terms of gaps in digital literacy.

Table 20. Gaps in Digital Literacy.

Statement	Weighted Mean	Verbal Interpretation
Gaps in Digital Literacy		
1. Confident troubleshooting technical issues.	2.50	Often
2. Difficult to align tools with objectives.	2.50	Often
3. Able to cater to diverse learning needs.	3.50	Always
4. Competent in guiding critical thinking.	2.75	Often
5. Know how to evaluate quality/credibility.	3.75	Always
	3.00	Often

As shown in the table, the category of Gaps in Digital Literacy obtained a categorical mean of 3.00, interpreted as "Often." This suggests that while teachers are generally capable of using multimedia, technical barriers frequently interfere with instruction. Item 5 ("I know how to evaluate the educational quality and credibility of online tools") received the highest mean of 3.75 (Always). This indicates that the four teachers are highly critical and competent consumers of digital content. In contrast, Item 1 ("I feel confident troubleshooting minor technical issues") and Item 2 ("I find it difficult to align tools with objectives") tied for the lowest mean of 2.50 (Often).

The results imply a "Pedagogical-Technical Gap." Teachers are confident in choosing high-quality content but lack the technical training to fix it when it fails. This confirms that teacher training has successfully focused on instructional design but has neglected the basic IT skills needed for classroom resilience. The high mean for evaluating tool quality (3.75) contrasted with the low mean for troubleshooting (2.50) indicates that teachers are expert consumers but reluctant technicians. They can identify high-quality digital content, but their instructional flow is easily disrupted by minor technical glitches. Recent research highlights that this lack of "technical resilience" often leads to job dissatisfaction and a loss of motivation when technology fails during live instruction. The low score for aligning tools with learning objectives (2.50) suggests that while teachers use multimedia, they may not always be doing so strategically. This aligns with findings from the Philippine Department of Education and other studies suggesting that without clear educational goals, the integration of digital resources can become a distraction rather than an enhancement. Teachers are "Often" using the tools, but they struggle to ensure these tools directly drive the desired curriculum outcomes. A significant strength identified is the teachers' ability to use tools for diverse learning needs (3.50). This indicates that these four teachers view interactive multimedia primarily as a tool for inclusion. They leverage technology to reach students with different learning styles, which is a core competency in 21st-century "Education 4.0" frameworks that prioritize personalized learning paths. The "Gap" in digital literacy for these teachers is not a lack of general knowledge, but a specific lack of technical support and pedagogical mapping. They have the will to teach with technology, but they require better training in "Plan B" technical fixes and

deeper integration strategies to move from "using technology" to "teaching effectively with technology."

Unreliable Internet Connectivity

Unreliable internet connectivity is a primary "first-order barrier" that prevents teachers from fully utilizing interactive multimedia, often forcing them to abandon digital lessons in favor of traditional, manual methods. Inconsistent connectivity often forces educators to abandon digital lesson plans and revert to traditional, manual, or paper-based methods. Research on online learning during the COVID-19 pandemic highlighted that a stable internet connection is considered a "fundamental" first-order barrier (external to the teacher). Research from Macrothink Institute identifies that the lack of infrastructure in rural schools creates a significant "academic achievement gap," reinforcing a reliance on traditional methods compared to better-equipped private schools. While the impact of first-order barriers is diminishing in many developed countries, research in ERIC argues they remain the most pertinent barrier in local contexts where infrastructure has not yet stabilized. Table 21 shows the challenges encounter by the teachers in integrating interactive multimedia tools use in the classroom in terms of unreliable internet connectivity.

Table 21. Unreliable Internet Connectivity.

Statement	Weighted Mean	Verbal Interpretation
Unreliable Internet Connectivity		
6. Spend too much time buffering videos.	3.75	Always
7. Revert to traditional teaching methods.	3.75	Always
8. Download resources to use offline.	3.75	Always
9. Prepare alternative plans (Plan B).	4.00	Always
10. Collaborate to share offline resources	2.75	Often
	3.60	Always

The category of Unreliable Internet Connectivity yielded a categorical mean of 3.60, interpreted as "Always." This indicates that connectivity issues are a constant, daily struggle for the respondents. Item 9 ("I prepare alternative lesson plans for when technology fails") received a perfect mean of 4.00 (Always). The high scores for buffering (3.75) and reverting to traditional methods (3.75) highlight that teachers are often forced to abandon digital tools mid-lesson. The perfect score for "Plan B" (Item 9) reveals a "survivalist pedagogy." Teachers are motivated to use multimedia but do not trust the school's infrastructure. This "double-planning" adds a significant administrative burden to the teachers' daily workload.

The perfect mean of 4.00 for Item 9 indicates that these teachers no longer trust the school's internet infrastructure. While this shows a high level of professional responsibility, it also represents a double workload. Teachers are essentially planning two versions of every lesson—one digital and one traditional. This "redundant planning" is a major source of teacher burnout and suggests that technology is currently a source of stress rather than a labor-saving tool. With a mean of 3.75 for video buffering, the data shows that the "rhythm" of the classroom is frequently broken. In interactive multimedia learning, engagement is key; however, constant technical interruptions force teachers to "revert to traditional methods" (3.75). This regression means that even when teachers try to innovate, the poor infrastructure drags the pedagogy back to 20th-century lecture-style teaching. The high score for downloading resources in advance (3.75) shows that teachers have moved toward "Offline-First" strategies. They have adapted to the unreliable internet by bypassing it entirely before the lesson starts. However, the lower score for collaboration (2.75) suggests that

these offline resources are being managed individually rather than shared through a school-wide system. This indicates a need for a centralized "Offline Resource Bank" to save all teachers time. For these four teachers, Unreliable Internet acts as a "hard ceiling" on innovation. They are willing to use high-tech tools, but the infrastructure forces them to remain "low-tech" to ensure that learning continues. The data proves that bandwidth is currently a gatekeeper to 21st-century education in this specific school setting.

Insufficient Devices

Insufficient devices are a major "access constraint" that fundamentally limits the integration of interactive multimedia in the classroom. When the student-to-device ratio is inconsistent or high, teachers often default to traditional teaching methods despite having a strong desire to use technology. In the Philippines, the latest EDCOM 2 findings describe a "proficiency collapse," noting that high school students are trailing international benchmarks by approximately 5.5 years. This crisis is exacerbated by systemic infrastructure gaps, with nearly 78% of public schools lacking computer labs and many still facing basic electrification issues. Local studies, such as those from ResearchGate [23], suggest that while mobile phones are common, many learners remain at a "frustration level" in reading because they lack the high-quality, larger-screen devices (like laptops or tablets) necessary for the deep, focused navigation required by complex informational texts. The focus has shifted toward the quality of digital engagement rather than just physical ownership. Global assessments like the PISA 2022 Results ranked the Philippines 6th to last in reading, a position experts attribute partly to a lack of exposure to digital-only formats like hyperlinked articles and multimodal texts. Research published in ScienceDirect (2025) emphasizes that while ICT use for leisure can sometimes distract students, structured access to digital tools significantly improves vocabulary acquisition and grammar when properly integrated into the curriculum. However, an international study from the OECD (2024) warns that insufficient device access creates a "second-level digital divide," where students might have the internet but lack the specific digital literacy skills—such as evaluating online source credibility—needed to achieve high-level reading comprehension. Table 22 shows the challenges encountered by the teachers in integrating interactive multimedia tools use in the classroom in terms of insufficient devices.

Table 22. Insufficient Devices.

Statement	Weighted Mean	Verbal Interpretation
Insufficient Devices		
11. Hesitant to plan due to availability.	3.75	Always
12. Lack of devices creates inequality.	4.00	Always
13. Devices are outdated or unsuitable.	3.75	Always
14. Slow internet hinders device usage.	4.00	Always
15. Number of devices is insufficient.	4.00	Always
	3.90	Always

The category of Insufficient Devices obtained the highest categorical mean of 3.90, interpreted as "Always." This identifies hardware scarcity as the primary obstacle to multimedia integration. Items 12, 14, and 15 all scored 4.00 (Always). Teachers unanimously agree that class sizes exceed the number of available devices and that slow internet further hinders the use of what little hardware is available. The data suggests that for these four teachers, the "Digital Divide" is a physical reality in the classroom. Multimedia instruction is intended to be interactive and student-centered; however, without enough devices, the tools remain "demonstration-only," which significantly reduces their educational impact.

The perfect mean of 4.00 for Item 15 indicates a severe resource-to-student mismatch. Interactive multimedia is designed for "hands-on" student engagement; however, when the number of devices is insufficient, the pedagogy shifts from "student-centered interaction" to "teacher-centered demonstration." This confirms that the teachers are forced to teach about technology rather than having students learn with technology. The high score for Item 14 (4.00) shows that even if a teacher manages to secure a device, the slow internet often renders it a "paperweight." This suggests that hardware and connectivity are interdependent; one cannot succeed without the other. This results in a "hesitancy to plan" (3.50) because teachers do not want to risk a failed lesson due to equipment that is either missing or non-functional. Perhaps the most significant finding is the 4.00 mean for Item 12 regarding unfair opportunities. These four teachers are acutely aware that students who do not have access to a device during a lesson are falling behind. This creates a "lottery system" of education where only the students who get a working device that day can fully participate in 21st-century learning. For these four teachers, Insufficient Devices is the ultimate "bottleneck." No matter how digitally literate a teacher is, they cannot overcome the physical absence of hardware. The data proves that to achieve "Interactive Multimedia Integration," the school must first solve the Hardware Crisis before investing in more software or training.

Summary Findings

The collective data from the four (4) teacher-respondents reveals a significant "Integration Gap" where teacher readiness is high, but institutional support is critically low. Table 23 shows the summary of challenges encounter by the teachers in integrating interactive multimedia tools use in the classroom.

Table 23. Summary.

Category	Weighted Mean	Verbal Interpretation
Gaps in Digital Literacy	3.00	Often
Unreliable Internet Connectivity	3.60	Always
Insufficient Devices	3.90	Always
	3.50	Always

The overall group mean of 3.50 (Always) suggests that while teachers are "Often" ready to integrate technology, they are "Always" hindered by the school's environment. The findings indicate that infrastructure (Internet and Devices) is a more urgent problem than teacher digital literacy. The study investigated the integration of Interactive Multimedia Tools among four (4) teacher-respondents, focusing on digital literacy, connectivity, and device availability. The respondents obtained a categorical mean of 3.00 (Often). While teachers are highly competent in evaluating the quality of online educational tools (Mean: 3.75), they face consistent challenges in technical troubleshooting and aligning these tools with specific curriculum objectives (Mean: 2.50). This category earned a categorical mean of 3.60 (Always). The data reveals a "survivalist" approach to teaching, as 100% of the respondents (Mean: 4.00) always prepare alternative "Plan B" lesson plans to mitigate frequent video buffering and connection failures. This was identified as the most significant barrier, with the highest categorical mean of 3.90 (Always). There is a unanimous consensus (Mean: 4.00) that the number of devices is insufficient for the class size and that the lack of hardware creates unequal educational opportunities for students. The overall group mean of 3.50 (Always) indicates that while teachers are pedagogically ready to use interactive multimedia, they are "Always" hindered by systemic infrastructure gaps. The study concludes that hardware and connectivity are more critical obstacles than the teachers' actual digital skills.

The data shows a clear hierarchy of challenges. The highest barrier is Insufficient Devices (Mean: 3.85), followed closely by Unreliable Internet Connectivity (Mean: 3.60), while Gaps in Digital Literacy (Mean: 3.00) is the least severe. This suggests that the "digital divide" in this school is structural, not intellectual. The four teachers are mentally prepared to innovate but are physically restricted by a lack of hardware and bandwidth. A critical finding across all categories is the 100% reliance on "Plan B" (Mean: 4.00). Because teachers "Always" expect technology to fail—either due to a lack of devices or slow internet—they must effectively prepare two versions of every lesson. This hidden labor is a major source of professional stress and indicates that multimedia tools, which are meant to enhance efficiency, are currently doubling the teachers' workload. While the teachers are "Always" confident in evaluating tool quality (Mean: 3.75) and catering to diverse needs (Mean: 3.50), they feel only "Sometimes" confident in troubleshooting technical issues (Mean: 2.50). This confirms that their training has been successful in instructional design but has left them vulnerable to the technical glitches that are inevitable in a low-resource environment.

Significant Relationship Between the Interactive Multimedia Tools and the Reading Comprehension of Campatud Elementary School Learners

Correlation Between Multimedia Tool Utilization and Learner Reading Comprehension. Table 24 discloses the results of testing the relationship between the interactive multimedia tools and the reading comprehension.

Table 24. Correlation Between Multimedia Tools Utilization and Learner Reading Comprehension.

Variable	r	P-value	Interpretation	Decision	Result
Multimedia Tools vs. Reading Comprehension	0.85	0.02	Moderate to strong Positive correlation	Reject Ho	Significant

Note: Significance level set at $\alpha = 0.05$.

The statistical analysis reveals a significant relationship between the utilization of interactive multimedia tools and the reading comprehension levels of Key Stage 2 learners at Campatud Elementary School. As shown in the data, the computed **Pearson value is 0.85**, which indicates a **very strong positive correlation**. This high coefficient suggests that as the frequency and quality of multimedia integration (via television, laptops, and smartphones) increase, there is a consistent and substantial improvement in the students' reading comprehension performance. This implies that the digital interventions are not merely supplementary but are central to the learners' academic progress.

Furthermore, the test of significance yielded a **p-value of 0.02**, which is less than the standard alpha level of **0.05**. Consequently, the **null hypothesis is rejected**. This result confirms that the correlation between the variables is statistically significant and not due to random chance. From a pedagogical standpoint, the findings suggest that the multisensory nature of interactive tools provides the necessary "cognitive scaffolding" for pupils to better decode and understand text. Even with a veteran teaching staff, the strategic use of these technologies successfully bridges the gap in learner engagement, transforming reading from a passive task into an active, immersive experience. Ultimately, these results provide a robust empirical basis for the proposed development of multimedia-assisted reading exercises at the school [24].

This findings is supported by Vitvitskaya, digital tools offer an immersive learning environment where students can interact with letters and words in a dynamic and visually stimulating way. Digital applications that incorporate interactive storytelling, phonics-based games, and animated content have been shown to improve letter recognition, word decoding, and reading fluency. Similarly,

Zhao found that technology-driven learning captures students' attention, promotes independent learning, and deepens engagement. Incorporating interactive multimedia into the classroom allows educators to align instruction with students' digital tendencies, ultimately enhancing early literacy outcomes. Interactive multimedia, especially when combined with game-based designs, supports student engagement and motivation [25].

The global shift toward digital pedagogy is largely supported by the Cognitive Theory of Multimedia Learning, which suggests that students learn more deeply from a combination of words and pictures than from words alone. International research by Mayer emphasizes that interactive tools such as those found on laptops and smartphones allow learners to create mental models that bridge the gap between abstract text and concrete understanding. Furthermore, a 2025 study in *Frontiers in Education* noted that multimedia-assisted instruction significantly reduces the "cognitive load" on young readers, allowing them to focus more on the meaning of the text rather than just decoding individual words. These foreign studies consistently show that when learners can interact with a story through animations or clickable vocabulary cues, their retention and comprehension scores are markedly higher than those using traditional printed materials.

In the Philippine setting, the Department of Education's push for ICT-assisted instruction has become a cornerstone for literacy recovery programs. Local research, such as the 2025 review on Filipino students' reading comprehension, highlights that digital storytelling is particularly effective for Key Stage 2 learners because it aligns with their high interest in visual media. Studies conducted within the province of Bohol indicate that while the benefits of multimedia tools are widely recognized, their success is often dependent on the teacher's ability to integrate them despite hardware limitations. Moreover, findings by Barrot demonstrate that Filipino learners exposed to interactive reading exercises show a significant transition from the "frustration" level to the "instructional" level in the Phil-IRI (Philippine Informal Reading Inventory). These local findings reinforce the idea that multimedia tools serve as a vital equalizer in rural classroom settings, providing pupils with modern resources that foster both motivation and academic mastery.

Collectively, these study ratify that the integration of multimedia tools including interactive videos, gamified quizzes, and digital storytelling leads to measurable improvements in vocabulary mastery and text comprehension.

Results and Discussion

The integration of digital technology into classroom instruction has transformed educational practices by providing innovative opportunities to enhance learners' reading comprehension and engagement. Recognizing the increasing need for technology-supported instruction, this study developed a set of Interactive Multimedia Reading Exercises for Key Stage 2 learners that combines digital resources with evidence-based reading strategies to improve literacy outcomes. These learning exercises serve as the primary output of the study and are intended to support teachers in delivering engaging and meaningful reading instruction [27].

Reading comprehension continues to be one of the most fundamental skills that learners must develop to succeed academically. However, many Key Stage 2 learners experience difficulties in understanding texts, making inferences, identifying central ideas, and analyzing information critically. These instructional challenges highlight the necessity of designing innovative learning materials that address diverse learner needs. The Interactive Multimedia Reading Exercises were specifically developed to respond to these identified gaps by providing structured, learner-centered reading activities that integrate technology into literacy instruction.

Existing literature supports the integration of multimedia in reading instruction as an effective approach to improving learners' comprehension and motivation. Luz and Perez emphasized that

although digital technology has expanded access to information, it has also changed learners' reading habits, requiring instructional strategies that encourage deeper comprehension. Likewise, Sestoso [28] found that multimodal instructional materials, such as animations, comics, and interactive presentations, significantly improve learners' understanding and engagement. These research findings served as the foundation for the development of the Interactive Multimedia Reading Exercises.

The developed output consists of grade-level reading exercises for Grades 4, 5, and 6 integrated with carefully selected multimedia applications, including Storyline Online, ReadWorks, Canva for Education, Padlet, Mentimeter, Google Forms, and other interactive digital platforms. Each lesson incorporates multimedia-based activities before, during, and after reading to strengthen learners' vocabulary development, sequencing, inferential thinking, summarization, fact and opinion recognition, and critical reading skills [29].

Furthermore, the Interactive Multimedia Reading Exercises provide teachers with a practical instructional guide that includes lesson objectives, classroom procedures, suggested digital tools, collaborative learning activities, formative assessments, and implementation strategies. These components enable teachers to effectively integrate technology into daily reading instruction while maintaining alignment with curriculum competencies and learner needs.

Another significant feature of the developed learning exercises is their flexibility and adaptability. The instructional activities may be implemented in face-to-face, blended, or technology-assisted learning environments. Likewise, alternative offline strategies are included whenever internet connectivity or digital devices are limited, ensuring that the intervention remains accessible and applicable across different school contexts.

The output of this study is expected to serve as an instructional resource for teachers seeking innovative methods to improve reading comprehension among intermediate learners. By incorporating multimedia tools into reading instruction, the learning exercises promote active participation, collaboration, digital literacy, and higher-order thinking skills while creating engaging learning experiences that motivate learners to become more confident and independent readers.

Overall, the Interactive Multimedia Reading Exercises developed through this study represent the major research output, translating the study's findings into a practical and evidence-based instructional intervention. Grounded in current educational research and multimedia learning principles, this output is expected to enhance reading comprehension, strengthen literacy instruction, and provide teachers with an effective, research-informed resource that contributes to improved learning outcomes among Key Stage 2 learners.

Conclusion

This chapter presents the summary, findings, conclusion, and recommendations of the study.

Summary

This study aims to determine the relationship between the integration of interactive multimedia tools and the reading comprehension levels of elementary learners at Campatud Elementary School, Loon, Bohol, during the school year 2025–2026. Using a descriptive-correlational research design anchored on the Technological Pedagogical Content Knowledge (TPACK) framework, the study surveyed a total of 30 respondents, comprising 4 teachers and 26 learners from Grades 4, 5, and 6. Data were gathered using a multi-part researcher-made questionnaire and reading assessment tools, then analyzed through weighted mean, Pearson Correlation Coefficient, and T-tests [26].

Findings

Findings revealed that the respondents' pertinent information differed with regard to age, gender, civil status, teaching post, highest level of education attained, years of service, and involvement in pertinent workshops, seminars, and training. According to the profile, the majority of teacher responders are seasoned, all are female, and well-established in their careers. They hold senior teaching positions and continue to participate in professional development activities. These qualities imply that they are prepared to successfully support reading education. On the other hand, the learner-respondents are generally within the expected age range for Grade 4, 5, and 6 and show a balanced distribution in terms of gender, providing a representative basis for the study.

The study further examined the utilization of interactive multimedia tools at school and the challenges faced by the teachers. Results show while televisions and laptops are frequently utilized for visual presentations and interactive lessons, teachers face significant challenges, including unreliable internet connectivity, power interruptions, and gaps in digital literacy. Results indicated that the consistent use of digital storytelling and gamified modules significantly correlates with improvements in learners' reading comprehension skills.

In terms of learners' comprehension, the study evaluated the impact of multimedia tools on the reading experiences of 26 learners. The research utilized a 25-item survey covering five key areas: Engagement, Comprehension, Reading Skills Improvement, Motivation, and Challenges Encountered. Data were analyzed using weighted means to determine the effectiveness of multimedia integration in reading lessons. The learners strongly agreed that multimedia provides essential support, especially in understanding the story better and clarifying difficult words. High levels of attention, specifically noting that multimedia activities make lessons more interesting. Respondents indicated that multimedia significantly helps them remember what they read and boosts their reading confidence. Learners generally disagreed that they faced major obstacles. They found instructions easy to follow but noted a slight need for occasional technical assistance.

Finally, the study highlights that integrating inactive multimedia tools and reading comprehension are linked to each other. These technological interventions facilitated better retention and decoding skills, allowing students to move beyond "reading words" toward a more comprehensive understanding of the text. Ultimately, the study sought to validate the role of the teacher as an adaptive facilitator in a tech-savvy environment, ensuring that digital tools serve as a supportive bridge to academic success across all disciplines.

Conclusion

Based on the findings of the study, it can be concluded that the teacher-respondents characterized by high professional stability and maturity. This suggests that the implementation of multimedia tools relies on "master teachers" who have a deep well of traditional classroom wisdom but may require consistent upskilling to stay aligned with rapid digital shifts. Despite being veteran educators, there is a strong "culture of improvement" within the faculty. The staff is academically positioned to integrate modern research-based strategies, such as interactive multimedia, into their long-standing teaching practices. The student respondents (aged 9–11) are at a vital cognitive transition point moving from "learning to read" to "reading to learn." This age bracket possesses the necessary motor skills and maturity to navigate digital devices, making them the ideal demographic for multimedia-based comprehension interventions. The study reveals a distinct female predominance, particularly with a 100% female teaching staff. This implies that the reading interventions and classroom dynamics are influenced by female-centric pedagogical perspectives, which may correlate with the high level of reading interest observed in the predominantly female student group. The gap in "mid-career" teachers (4–10 years) suggests a bifurcated workforce of veterans and novices. This structure creates a unique opportunity for reverse mentorship, where younger, tech-savvy teachers can support veterans in digital tool integration, while senior teachers

provide the foundational expertise in literacy instruction. In terms of reading comprehension, the integration of multimedia such as video animated stories, interactive e-books, and audio-assisted tools has a bigger impact to learners' reading comprehension. These tools provide a "visual bridge" that helps students decode complex words and retain information more effectively than traditional text only methods. Interactive multimedia facilitates better vocabulary acquisition and memory retention by providing dual-sensory input (sight and sound). This is particularly effective for your 9-11 year-old group, as they are in a cognitive stage where visual aids help make abstract language concepts more concrete. Students report higher levels of enjoyment and are more likely to persist with difficult texts when they are presented through engaging digital formats. Overall, Multimedia resources accommodate various learning styles by offering multiple ways to interact with the content. This flexibility ensures that learners with different prior knowledge levels can navigate materials at their own pace, leading to a more personalized and effective learning experience. It allows seasoned educators to meet tech-savvy students where they are, turning potential reading failure into academic engagement. Based on the findings and conclusions of the study, several recommendations are offered to improve integrating inactive multimedia tools to learners' comprehension. To address the challenges of unreliable internet connectivity, teachers should prioritize the use of interactive offline applications and pre-downloaded educational videos. This ensures that reading engagement and comprehension activities remain uninterrupted. Teachers should select interactive multimedia tools that focus on high-level comprehension, such as digital graphic organizers, interactive story maps, and gamified vocabulary quizzes that challenge their cognitive maturity. Integrate "Talking Books" or interactive e-books that require the learner to make choices or solve puzzles based on what they just read. This ensures that engagement translates directly into deeper processing of the text. Learners are cognitively similar but may have different reading speeds, the school should utilize interactive modules that allow students to progress at their own pace. This prevents faster readers from becoming bored and ensures struggling readers are not left behind during classroom television or laptop presentations.

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