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Modalities on English comprehension and retention among grade 11 HUMSS learners at Osias Educational Foundation, Inc.



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Abstract

This study examined the effects of print and digital reading modalities on the English reading comprehension and retention of Grade 11 Humanities and Social Sciences (HUMSS) learners at Osias Educational Foundation, Inc. It specifically determined learners' demographic profiles, reading preferences, and levels of comprehension and retention using the two reading modalities. The study also tested whether significant differences existed in learners' comprehension and retention performance between print and digital reading. Findings revealed that learners generally preferred print materials, although preferences varied by sex. In terms of comprehension, learners obtained higher mean scores when reading printed texts than digital texts. Similarly, print reading yielded better retention outcomes, with 53.6% of learners obtaining an excellent rating and none classified as poor. In comparison, digital reading recorded 35.7% excellent and 7.1% poor retention ratings. Despite these differences in mean scores, statistical analysis showed no significant difference between print and digital reading modalities in terms of comprehension and retention (p greater than 0.05). Thus, the null hypotheses were accepted, indicating that both modalities can support learners' reading development. Nevertheless, the consistent advantage of print reading highlights its potential value in promoting focused reading, comprehension, and information retention. Based on the findings, a Reading Enhancement Program was proposed, emphasizing print-based reading materials, guided annotation, story mapping, structured questioning, and reflective activities to develop higher-order thinking skills. Digital materials were likewise recommended as supplementary resources to provide learners with varied and accessible reading experiences.

Keywords: English reading comprehension, reading retention, digital reading, print reading, HUMSS learners

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1. Introduction

In the digital age, reading practices have undergone a significant transformation. With the widespread availability of smartphones, tablets, and other electronic devices, students increasingly engage with digital texts in place of traditional print materials. While digital reading offers convenience, accessibility, and interactivity, concerns persist regarding its impact on learners' comprehension and retention abilities. Several studies suggest that the medium of reading, whether digital or print may influence how effectively learners process and remember information. However, there remains a lack of localized data on how these modes specifically affect Filipino senior high school learners, particularly those in the Humanities and Social Sciences (HUMSS) strand, who are expected to develop advanced reading and critical thinking skills. The integration of technology into education has significantly reshaped how students acquire, process, and engage with information in the 21st century. The emergence of digital technologies including laptops, tablets, smartphones, and internet-based applications has catalyzed a paradigm shift from traditional, print-based education toward more interactive, flexible, and technology-driven learning environments. As educational systems around the world increasingly embrace digital tools, classrooms have evolved into hybrid spaces that combine conventional instructional methods with multimedia resources, online platforms, and real-time communication technologies (OECD, 2020).

Digital reading platforms, such as e-books, online articles, learning management systems (LMS), and educational websites, have become integral to the learning experience. These tools offer a variety of benefits such as instant access to vast repositories of information, multimedia integration to enhance understanding, and personalized learning paths. However, while the efficiency and convenience of digital reading are widely recognized, ongoing academic discourse has raised concerns about its cognitive effects particularly its impact on students' reading comprehension and retention (Singer & Alexander, 2017; Delgado et al., 2018). Digital reading is often praised for its portability, searchability, and interactivity. However, empirical studies suggest that screen-based reading can lead to cognitive overload, fragmented attention, and reduced textual engagement. Researchers such as Delgado et al. (2018) have reported that students reading digital texts may exhibit lower comprehension scores than those reading print, particularly when tasks require deep, critical engagement. These issues are frequently attributed to the non-linear nature of screen reading, the temptation to multitask, and the physical strain of prolonged screen exposure. Conversely, print reading fosters linear reading habits, deeper focus, and improved memory consolidation, factors essential in subjects requiring analytical and interpretive skills, like English.

Globally, numerous studies have attempted to compare digital and print reading. Singer and Alexander (2017) found that while students favored digital reading for convenience, print readers demonstrated better comprehension and retention, especially with complex texts. These findings have led to continued debates in the academic community regarding the cognitive and pedagogical impacts of reading platforms. Moreover, Delgado et al. (2018) conducted a meta-analysis showing that print reading generally leads to higher comprehension outcomes compared to digital reading, particularly when deep learning is required. In the Asia-Pacific region, where digital education is rapidly expanding, countries like the Philippines face unique challenges in balancing innovation with equity. Although digital initiatives have been widely adopted, such as the Department of Education's (DepEd) Learning Continuity Plan, DepEd Commons, and Digital Rise Program, the issue of unequal access persists, particularly among students from rural and underserved areas (DepEd, 2020).

In 2020, the COVID-19 pandemic in the Philippine context accelerated the integration of educational technologies, prompting schools to implement modular, online, and blended learning delivery modes. The Department of Education has acknowledged the dual role of both digital and print texts in promoting literacy. However, studies have shown that many students struggled to adapt to these changes due to varying levels of

digital literacy, lack of personal learning devices, and inconsistent internet access (SEAMEO INNOTECH, 2020). Despite the government's push for digital transformation, recent national assessments have highlighted ongoing deficiencies in Filipino learners' reading comprehension, thereby pointing to the need for pedagogical strategies that are both technologically responsive and evidence-based.

In line with the United Nations' Sustainable Development Goal 4 (SDG 4), which advocates for inclusive and equitable quality education and lifelong learning opportunities for all, the issue of reading comprehension and retention among Filipino learners takes on global importance. SDG 4 emphasizes the need to ensure that all learners acquire foundational literacy and numeracy skills as a prerequisite for higher-order thinking and lifelong learning. The persistent gaps in reading proficiency revealed by international and national assessments underscore the urgency of localized interventions that directly contribute to this global agenda. Complementing this global framework, the 2022 Programme for International Student Assessment (PISA) revealed that the Philippines ranked 77th out of 81 participating countries with an average score of 347 in reading literacy, significantly below the OECD average of 476 (OECD, 2023. Only 24% of 15-year-old Filipino students achieved Proficiency Level 2 or higher, the minimum level required to demonstrate baseline reading competency. In contrast, 74% of learners in OECD countries reached this benchmark (OECD, 2023). A deeper analysis reveals that nearly 80% of Filipino learners scored below Level 2, indicating difficulty in understanding moderately complex texts, making inferences, and evaluating textual content. Regionally, learners from urban areas such as the National Capital Region (NCR) tended to score higher than those from rural or less developed regions, reflecting socioeconomic and educational resource gaps (UNICEF, 2020).

Although the Department of Education reported a slight improvement in secondary reading proficiency from 20% in 2018 to 23.7% in 2022, these figures remain significantly below both Association of Southeast Asian Nations (ASEAN) and global standards (DepEd, 2023). This alarming performance underscores systemic challenges in literacy development, even as the country undergoes a digital shift in its educational delivery. The transition to digital learning though necessary and inevitable has not been equally beneficial for all, especially considering technological disparities across regions. Complementing the PISA findings, regional assessments such as the Philippine Informal Reading Inventory (Phil-IRI), a standardized tool developed by the Department of Education to assess learners' reading levels provides a more localized lens on reading proficiency. The 2025 Phil-IRI results for La Union, Region I, revealed that a significant number of secondary school learners remain at the instructional and frustration levels in English reading comprehension. These levels indicate that many learners struggle to independently decode and understand grade-level texts, and often require scaffolding to make meaning from what they read. Such findings are particularly concerning for senior high school learners, who are expected to demonstrate higher-order thinking and sustained comprehension across both print and digital platforms.

Taken together, these results reflect not only the national trend of low reading performance but also a regional literacy concern that demands immediate and localized intervention. They highlight the urgent need for targeted reading enhancement programs and evidence-based instructional strategies to strengthen English literacy, particularly in the context of Region I's ongoing transition toward blended and digital learning environments. These national trends are mirrored in La Union province, where the uptake of educational technology varies widely across municipalities and institutions. Some schools have successfully integrated devices and e-learning systems into classroom routines, while others continue to rely on traditional print materials due to infrastructural and logistical limitations.

In recent years, municipalities in the province of La Union have seen a steady integration of digital technologies into various sectors, including education. As part of Region I's continuous push for digital transformation and inclusive learning, local schools have increasingly adopted both traditional and digital modes of instruction to keep pace with educational reforms and global literacy standards (Department of Education [DepEd] Region I, 2023). Despite this shift, educational stakeholders in rural areas such as Balaoan still grapple with critical concerns regarding the effectiveness of these modes, particularly in reading comprehension and information retention among senior high school students.

In Balaoan, where literacy and academic success remain pivotal to youth development, reading proficiency has been a cornerstone of the local DepEd division's programs. However, with the proliferation of smartphones, tablets, and internet access, learners' preferences for digital content have shifted their reading behaviors. These technological trends prompt important questions. Does digital reading promote the same level of understanding and long-term memory as traditional print? How does this shift affect learners' comprehension in English, a core subject vital to academic and professional success? During the pandemic, schools including Osias Educational Foundation, Inc. (OEF), a private higher education institution (PHEI) in Balaoan implemented blended learning modalities, utilizing both online platforms and printed Self-Learning Modules (SLMs). While this approach aimed to ensure continuity of education, access to digital technologies was uneven. Many learners, particularly those from geographically isolated barangays, depended solely on printed modules, highlighting the deep digital divide in rural education.

This localized scenario raises a crucial academic question on how different reading modalities, digital and print affect English comprehension and retention among senior high school learners in such contexts. This issue becomes even more pertinent at the institutional level, particularly within Osias Educational Foundation, Inc., committed to fostering 21st-century learning. As part of its Senior High School (SHS) program, the school offers the Humanities and Social Sciences (HUMSS) strand, where English subjects play a vital role in shaping learners' critical thinking, communication, and analytical skills. The foundation's English curriculum, designed to enhance both reading comprehension and academic retention, must contend with the challenges posed by the ongoing digital transition in education. Teachers at OEF have noted varying outcomes in learner performance, depending on whether learners engage with print or digital materials, raising pedagogical and programmatic concerns.

Given the essential role of English in academic success, especially within the Humanities and Social Sciences (HUMSS) strand where critical reading and analysis are key competencies, it is vital to understand how reading format influences learning outcomes. Thus, this study aimed to investigate the effects of digital and print reading on English comprehension and retention among Grade 11 HUMSS learners of Osias Educational Foundation, Inc., located in Balaoan, La Union. By systematically comparing these two formats, the research sought to provide empirical evidence that guides the development of a context-sensitive Reading Enhancement Program, aiming to improve literacy outcomes and support instructional decisions in similar low-resource, semi-digital learning environments.

Research Paradigm - The study is guided by the Input–Process–Output (IPO) model which illustrates the flow of the research from the independent variables to the dependent outcomes. The framework visualizes how reading modalities (digital and print) and demographic factors influence learners' reading comprehension and retention, and how these findings contribute to the development of a proposed reading enhancement program.

Statement of the Problem - This study aimed to address this gap by examining whether the mode of reading significantly affects learners' reading comprehension and retention. The findings served as a foundation for evidence-based interventions to enhance learners' reading outcomes within the English curriculum. Specifically, this study sought to answer the following research questions:

- What is the demographic profile of the Grade 11 Humanites and Social Sciences learners in terms of Age? Sex? Socio-economic Status? Reading Preference?
- What is the level of reading comprehension among Grade 11 HUMSS learners when using: a. A digital English text? b. A printed English text?
- What is the level of reading retention among Grade 11 HUMSS learners when using: a. A digital English text? b. A printed English text?
- Is there a significant difference between digital and print reading in terms of a. Reading comprehension? b. Reading retention?

- What reading enhancement program can be developed based on the findings?

2. Research Design

This study employed a quantitative comparative research design, specifically employing a true-experimental method, to examine the effects of digital and print reading formats on the English comprehension and retention of Grade 11 HUMSS learners at Osias Educational Foundation, Inc. The true-experimental design was appropriate as it allows the comparison of two existing groups, learners using digital texts and those using print texts, with random assignment, thereby preserving the integrity of class groupings. By utilizing post-tests to assess comprehension and retention, the study aimed to determine whether significant differences exist in learners' performance based on the reading format. The findings informed the development of a reading enhancement program that responds to the reading preferences and learning needs of 21st-century learners.

Study Size and Setting - The study was conducted at Osias Educational Foundation, Inc., located in Balaoan, La Union, Philippines. This private academic institution offers Senior High School programs, including the Humanities and Social Sciences (HUMSS) strand, which was the focus of the research. The school is equipped with resources for both traditional and technology-based instruction, including a library, internet access, televisions, and digital devices. Osias Educational Foundation, Inc was selected as the research locale due to its commitment to supporting academic research, the availability of print and digital materials, and its learners' familiarity with blended learning methods. The research was implemented during the first semester of the School Year 2025–2026 within the learners' regular English classes that ensure an authentic and uninterrupted learning environment.

Participants - The study involved fifty-six (56) Grade 11 learners from the HUMSS strand at Osias Educational Foundation, Inc. These learners served as the main data sources for evaluating the effects of reading format on English comprehension and retention. Participants were randomly assigned to one of two experimental groups using a lottery method to eliminate selection bias and establish group equivalence. The first group, referred to as the Digital Group, read the assigned text using digital devices such as smart phones. The second group, known as the Print Group, read the same text in printed format.

Table 1
Distribution of Participants

Group	Description	Number of Participants	Percentage
Digital Group	Read the assigned text using digital devices	28	50%
Print Group	Read the same text in printed format	28	50%

The table presents the distribution of participants in the study according to their assigned reading groups. As shown, the Grade 12 HUMSS learners were evenly divided between the Digital Reading Group (50.00%) and the Print Reading Group (50.00%), with 28 participants in each group. This equal distribution ensured balanced representation of both reading modalities, allowing for a fair comparison of the effects of digital and print reading on learners' English comprehension and retention.

Sampling Techniques - This study utilized a true experimental design to investigate the effects of reading modality, digital versus print on learners' reading comprehension. Participants were randomly assigned to either the digital or print group, ensuring that each had an equal chance of being exposed to either condition. This randomization supports internal validity and allows for causal inferences regarding the impact of reading format on comprehension performance.

Data Gathering Procedures - The data collection took place over one week and followed a systematic process. Initially, the researcher obtained permission from the school president and coordinated with Grade 11 teachers. Parental consent and student assent forms were distributed to ensure ethical compliance. A researcher-made questionnaire underwent a validation process and was distributed to the participants. The 56 participants were then assigned to either a digital or print reading group. A pre-reading orientation was conducted to explain the tasks and

ensure that learners in the digital group are familiar with navigating the digital material. Learners were given thirty minutes to read the same narrative text in their assigned format, followed immediately by the comprehension test to assess their understanding of the material. One week later, without prior notice, both groups took a delayed post-test to evaluate how much information they retained over time. All procedures were conducted in a supervised classroom setting to maintain consistency and control. The test results were then collected, tabulated, and subjected to statistical analysis.

Research Instruments - To measure comprehension and retention, the instruments used in the study include standardized reading materials and researcher-made assessments along with a survey questionnaire. The reading materials consisted narrative texts from the Grade 11 English curriculum, selected for their appropriateness in length, difficulty level, language, and theme. These texts were presented in two formats which were digital (Word file in smartphone-based display) and printed handouts. For comprehension and retention assessment, a researcher-made test was developed with multiple-choice questions targeting literal, inferential, evaluative/critical, and applied/synthesis comprehension.

Reading Comprehension and Retention Item Distribution - To evaluate students' reading comprehension and retention across digital and print modalities, a standardized 20-item test was constructed. The items were distributed across four cognitive levels to ensure a comprehensive assessment of comprehension skills. This distribution aligns with the study's objective to compare how different reading formats affect various dimensions of understanding.

Reading Comprehension and Retention Item Distribution (Total: 20 Questions)

Level	Description	Number of Items	Percentage	Item Number
Literal	Understanding facts and details directly stated in the text	10	50%	1 - 10
Inferential	Making logical guesses based on clues and context	7	35%	11 - 17
Evaluative/Critical	Judging the text's quality, credibility, and reasoning	2	10%	18 - 19
Applied/Synthesis	Connecting ideas to other texts or real-world situations	1	5%	20

Adapted from the study Levels of reading comprehension and their skills by Adom, D., et al. (2017).

The reading comprehension and retention items were distributed across four cognitive levels: literal, inferential, evaluative/critical, and applied/synthesis. The predominance of literal items (50%) reflects the foundational importance of recognizing and recalling explicitly stated information, which Adom et al. (2017) identify as the lowest but most essential level of comprehension. Inferential items (35%) highlight the need for learners to "read between the lines" and construct meaning from contextual clues, thereby fostering deeper engagement with the text. Meanwhile, evaluative or critical comprehension (10%) emphasizes the capacity to judge the credibility, logic, and quality of textual arguments, aligning with Adom et al.'s assertion that readers must develop critical literacy skills to assess validity and bias. Finally, the inclusion of applied or synthesis comprehension (5%) underscores the creative dimension of reading, where learners connect textual insights to real-world contexts and generate new understandings. This balanced distribution demonstrates a deliberate effort to scaffold learners from basic recall toward higher-order thinking, consistent with Adom et al.'s (2017) framework that reading comprehension should progress from literal understanding to evaluative and creative application.

Each participant answered the same set of questions, with the only variable being the format of the reading material, either digital or print. This controlled design enabled a reliable comparison of comprehension performance across cognitive levels and reading formats. A retention test was administered a week later, included rephrased questions that minimized memory bias and accurately assess long-term understanding. Both instruments underwent content validation by experienced English educators using the same evaluation checklist that ensured the test items were aligned with the appropriate learning competencies and measured the intended skills effectively. The tool assessed content relevance, alignment with comprehension levels, clarity of questions, and suitability for

Grade 11 HUMSS learners. All instruments were administered under controlled conditions to ensure data integrity.

Instrument Validation Process - To ensure the appropriateness and reliability of the research instrument used in this study, a survey questionnaire and a content validation procedure were conducted using a structured ten (10) specific criteria checklist: (1) relevance of items to the objectives of assessing reading comprehension and retention; (2) alignment with the four levels of comprehension: Literal, Inferential, Evaluative/Critical, and Applied/Synthesis; (3) clarity and understandability of items for Grade 11 HUMSS learners; (4) appropriateness of wording and sentence structure; (5) logical and unambiguous answer choices; (6) absence of bias, stereotypes, or cultural inappropriateness; (7) grammatical accuracy and formatting; (8) suitability of difficulty level; (9) adequacy in measuring both comprehension and retention skills; and (10) overall readiness of the test for administration. Furthermore, a structured validation form was also provided, using a four-point descriptive rating scale adapted from Oducado's (2019) **Survey Instrument Validation Rating Scale**, which is widely used in educational research. The table on the succeeding page presents the rating scale used in the validation process: The weighted mean of rating for each criterion was computed across the three expert validators, and an overall mean score was derived to summarize the instrument's validity level.

Rating Scale Used in Validation of Test Questions

Scale	Description	Definition
4	Highly Valid	The item is exceptionally appropriate, clearly stated, and fully aligned with the study objectives. No revision is necessary.
3	Valid	The item is generally appropriate and relevant, with minor revisions recommended for clarity or precision.
2	Slightly Valid	The item shows limited relevance or clarity. Major revisions are needed to improve alignment with the study objectives.
1	Not Valid	The item is inappropriate, unclear, or unrelated to the study objectives. Recommended for removal.

Adapted from Survey Instrument Validation Rating Scale by Oducado, 2019

Since all criteria were asigned equal weights (4), the weighted mean simplifies to the average of the validators' ratings for each criterion. Table 4 presents the checklist used in the validation process:

Criteria Checklist for Validation of Test Questions - Validators rated each criterion using a 4-point scale. Weighted mean values were computed per criterion to determine the overall quality of the test items. The resulting mean scores of expert ratings were computed and interpreted using a standardized rating scale. This scale provided clear descriptors for evaluating each item's relevance, clarity, and alignment with the study objectives. The table below presents the interpretation framework used to classify items based on their weighted scores: relevance, clarity, and alignment with the study objectives. The table below presents the interpretation framework used to classify items based on their weighted scores:

Criteria	4	3	2	1
1. The test items are relevant to the objectives of assessing reading comprehension and retention.				
2. The items are aligned with the levels of comprehension (Literal, Inferential, Evaluative/Critical, and Applied/Synthesizing).				
3. The test items are clear and understandable to Grade 11 HUMSS learners.				
4. The wording and sentence structure of the items are appropriate for the learners' level.				
The options (choices) are logical, plausible, and free from ambiguity.				
6. The test items are free from bias, stereotypes, or cultural inappropriateness.				
7. The items are grammatically correct and properly formatted.				
8. The difficulty level is suitable for Grade 11 students.				
9. The test adequately measures both comprehension and retention skills.				
10. The overall test is valid and ready for administration.				

Mean Rating Scale - This scale guided the decision-making process regarding item retention, revision, or elimination. Items rated as "Highly Valid" were retained without changes, while those falling under "Valid" or "Slightly Valid" were revised accordingly. Items rated as "Not Valid" were excluded from the final instrument. This interpretation framework was adapted from the validation guidelines presented by De Guzman and Tan (2020).

Mean Range	Description	Interpretation
3.50 – 4.00	Highly Valid	The item is exceptionally appropriate, clearly stated, and fully aligned with the study objectives, requiring no revision.
2.50 – 3.49	Valid	The item is generally appropriate and relevant, though minor revisions may be recommended for clarity or precision.
1.50 – 2.49	Slightly Valid	The item shows limited relevance or clarity and the need for substantial revision to improve alignment
1.00 – 1.49	Not Valid	The item is inappropriate, unclear, or unrelated to the study objectives and recommended for removal.

Adapted from Validation Guidelines by De Guzman and Tan (2020)

This structured validation process provided a quantitative and qualitative basis for refining the instrument, ensuring its pedagogical soundness and alignment with the cognitive and linguistic level of the target learners. The use of mean ratings and interpretation thresholds follows the recommendations of Polit and Beck (2006), who emphasized the importance of systematic expert judgment in establishing content validity.

Scoring and Interpretation of Results - The comprehension and retention assessment scales used in this study were adapted from Bloom's Taxonomy (Bloom, 1956; Anderson & Krathwohl, 2001) and the retention framework of Nero & Zulkiply (2021). The adaptation restructured the levels into a five-point scale (Poor to Excellent) with score ranges of 0–4, 5–8, 9–12, 13–16, and 17–20 to provide clearer diagnostic categories. Learners' performance was evaluated using this scale to ensure objectivity, consistency, and fairness. By distinguishing five levels of achievement, the framework captures varying degrees of proficiency without oversimplifying results, allowing for nuanced interpretation while maintaining clarity and reliability. This approach also supports consistency in data analysis and aligns with established educational evaluation practices.

5-Point Rating Scale for Reading Comprehension

Level	Score Range	Learner Performance	Assessment Focus
Excellent	17–20	Demonstrates exceptional comprehension; integrates, critiques, and applies ideas across varied texts and contexts	Advanced synthesis, critical evaluation, real-world application, personal insight
Very Good	13–16	Applies knowledge creatively; connects ideas across texts with minimal guidance	Applied comprehension, cross-text analysis, author's craft, thematic integration
Good	9–12	Demonstrates solid understanding; analyzes and evaluates text independently	Analytical comprehension, author's purpose, argument strength, bias detection
Fair	5–8	Shows partial understanding; infers meaning with support	Inferential comprehension, predictions, cause-effect relationships, implied meaning
Poor	0–4	Struggles with basic understanding; needs guidance to identify main ideas and details	Literal comprehension, vocabulary recall,

Adapted from Bloom's Taxonomy by Bloom (1956) and Anderson & Krathwohl (2001)

The scales on the succeeding pages outline the 5-point rating scale used for comprehension and retention level, which evaluates understanding immediately after reading the assigned digital or print text and assesses how much information participants were able to recall after a specified time interval. These scales ensure objective classification of learner performance for each variable under investigation.

5-Point Rating Scale for Reading Retention

Level	Score Range	Learner Performance	Assessment Focus
Excellent	17–20	Demonstrates long-term retention; applies recalled information across varied contexts with insight and independence	Transfer of learning, synthesis, real-world application, cross-text retention
Very Good	13–16	Recalls key ideas and details accurately; explains concepts clearly without prompts	Independent recall, concept explanation, thematic consistency
Good	9–12	Retains essential information; retrieves and connects ideas with minimal support	Partial recall, guided retrieval, basic conceptual linking
Fair	5–8	Retains limited information; needs cues to retrieve and organize ideas	Scaffolded recall, fragmented retention, cue-dependent retrieval

Poor	0–4	Shows minimal retention; struggles to recall even basic facts without support	Short-term memory, basic fact retrieval, recognition-based tasks

Adapted from the Asian Journal of University Education by Nero & Zulkiply (2021).

Data Processing and Analysis - To organize and interpret learner performance, a format was used to organize the raw scores collected during the data gathering phase. The performance levels were interpreted using the validated rating scales described earlier in this section. The data collected from the reading comprehension and retention assessments were analyzed using Jamovi, a user-friendly statistical analysis software, along with Microsoft Excel for data tabulation and organization. Descriptive statistics such as mean (average score), median, mode, and standard deviation were computed to summarize the learners' performance in both digital and print reading formats. Jamovi was also utilized to perform the appropriate inferential statistical tests to determine whether there is a significant difference in comprehension and retention between the two modes of reading. The study used an independent samples t-test to evaluate the reading comprehension and retention levels of the participants after exposure to both digital and print texts. This statistical method was used to compare the mean scores of the two groups for each domain. The results of these analyses provided empirical evidence on the relative effectiveness of print versus digital reading formats in enhancing comprehension and retention among Grade 11 HUMSS learners.

Ethical Considerations - The researcher ensured that the study was conducted with respect for the rights and welfare of all participants. Prior to data collection, a formal permit to conduct the study was sought and approved by the School President and the administration of Osias Educational Foundation, Inc. Informed consent was then obtained from the learners, who were made fully aware of the objectives, procedures, and voluntary nature of their participation. Confidentiality and anonymity were maintained by using codes instead of names and by securing all records in restricted files accessible only to the researcher. Learners were assured of their right to withdraw at any time without academic or personal consequences. The study also followed the principles of beneficence and non-maleficence by ensuring that the reading materials used in both digital and print modalities were age-appropriate, culturally sensitive, and aligned with the learners' curriculum, thereby avoiding psychological or academic harm. Integrity in data collection and reporting was observed by presenting findings honestly and without fabrication or misrepresentation. Furthermore, the research complied with national legal frameworks such as the Data Privacy Act of 2012 (Republic Act No. 10173), which protects personal information, and Article XIV, Section 1 of the 1987 Philippine Constitution, which emphasizes the right to quality education. It also aligned with relevant DepEd Orders and CHED Memoranda that highlight ethical responsibility and learner protection in research. Through these measures, the study was conducted with fairness, transparency, and respect for the dignity of all participants.

3. Results and Discussion

This section presents the results of the study. It begins with the demographic profile of the participants, followed by the validation of the researcher-constructed test questions, and finally the results of the comprehension and retention tests administered to the digital and print reading groups.

Demographic Profile of Participants- The demographic profile of participants provides the necessary background information about the participants, which serves as the basis for interpreting the subsequent findings. The table presents a breakdown of learners by age group, sex, socio-economic status and reading preference along with their counts and percentage of the total. The data reveals a predominantly homogeneous group in terms of age and socio-economic status, with moderate variation in sex and reading preference. As shown in Table 1, the majority of Grade 11 participants fall within the 15–16 age bracket (89.3%), with a slightly higher proportion of males (57.1%) than females (42.9%). This age distribution aligns with the expected developmental stage of late adolescence, where learners are transitioning into higher-order thinking and abstract reasoning. This has direct implications for reading comprehension and retention strategies, as learners are increasingly capable of engaging with inferential texts, synthesizing information, and applying critical thinking.

Table 2
Demographic Profile of Learners in terms of Age, Sex, Socio-economic Status, and Reading Preference

Demographic Profile	Category	Frequency (n)	Percentage (%)
Age	15-16	50	89.3%
	17-18	6	10.7%
	Total	56	100%
Sex	Male	32	57.1%
	Female	24	42.9%
	Total	56	10%
Socio-Economic Status	High income (₱70,001 - ₱100,000)	0	0%
	Upper middle income (₱40,001 - ₱70,000)	8	14.2%
	Middle income (₱20,001 - ₱40,000)	45	80.4%
	Low income (₱20,000 and below)	3	5.4%
	Total	56	100%
Reading Preference	Print	32	57.1%
	Digital	24	42.9%
	Total	56	100%

Socio-economic data further show that most participants (80.4%) belong to the middle-income bracket, with smaller proportions classified as upper middle income (14.2%), low income (5.4%), and none belong to high income household. This distribution suggests that most learners have access to basic educational resources, which can support their academic engagement. According to Bronfenbrenner's ecological systems theory, socio-economic status is part of the microsystem that directly affects learners' development and academic performance. Middle-income learners may benefit from stable home environments and basic educational support, while those from very low-income backgrounds may face challenges such as limited access to books, internet, or quiet study spaces. These disparities highlight the need for equitable instructional strategies and resource-sensitive interventions in reading comprehension and retention programs to ensure that all learners, regardless of economic background, can thrive academically.

In terms of reading preference, print reading is slightly more preferred overall, with 57.1% of the sample over digital formats (42.9%). This distribution suggests that while both formats are used, female learners tend to favor print, whereas male learners show a stronger inclination toward digital reading. According to Dual Coding Theory (Paivio, 1986), learners process information more effectively when both verbal and visual systems are engaged, something digital formats often enhance through multimedia integration. However, Cognitive Load Theory (Sweller, 1988) cautions that excessive digital stimuli can overwhelm working memory, especially for learners still developing metacognitive strategies. The demographic profile suggests that learners' socio-economic background and reading preference may influence their engagement with texts. For instance, those with greater access to devices may lean toward digital reading, while others continue to rely on print. These contextual factors provide important insights into how reading interventions should be tailored.

Reading Comprehension Level - Learners' comprehension scores were analyzed immediately after reading the assigned text. Scores were interpreted using the 5-point rating scale (Excellent, Very Good, Good, Fair, and Poor). The results of the reading comprehension test reveal clear differences in learner performance between digital and print texts when assessed using the five-point scale.

Table 3
Reading Comprehension Level of Learners when Using Digital and Print

Reading Materials	Comprehension Level	Frequency (*f*)	Percentage (%)
Digital English Text	Excellent (17-20)	1	3.6%
	Very Good (13-16)	12	42.9%
	Good (9-12)	9	32.1%
	Fair (5-8)	5	17.8%
	Poor (1-4)	1	3.6%
	Total	56	100%

	Excellent (17-20)	2	7.1%
	Very Good (13-16)	14	50.0%
Print English Text	Good (9-12)	9	32.1%
	Fair (5-8)	3	10.7%
	Poor (1-4)	0	0%
	Total	28	100%

In the digital group, the largest proportion of learners (42.9%) were classified as Very Good, showing strong comprehension and the ability to connect ideas across texts with minimal guidance. A further 32.1% fell under the Good category, demonstrating solid understanding and independent analysis, while 17.8% were categorized as Fair, reflecting partial comprehension and reliance on cues to infer meaning. Only 3.6% reached the Excellent level, indicating exceptional comprehension and the ability to synthesize ideas creatively, while another 3.6% fell into the Poor category, struggling with basic understanding. In contrast, the print group showed stronger outcomes, with half of the learners (50%) achieving Very Good comprehension and 7.1% reaching Excellent. Fewer learners were classified as Fair (10.7%), and none fell into the Poor category, suggesting that print texts provided a more stable and cognitively efficient medium for comprehension.

According to Paivio's Dual Coding Theory (1986), print materials reduce competing visual stimuli, allowing learners to focus more effectively on verbal processing, which may explain the higher scores in print reading. Schema Theory, as proposed by Bartlett (1932) and Rumelhart (1980), further supports these findings by emphasizing that comprehension improves when learners connect new information to existing knowledge structures; print texts, being familiar and linear, may better activate these schemas. Cognitive Load Theory (Sweller, 1988) also provides insight, as digital formats can impose higher extraneous cognitive load due to multitasking, scrolling demands, or fragmented layouts, which may strain working memory and hinder deep comprehension. Constructivist Theory (Piaget, 1972) also provides insight, as learners actively construct meaning through interaction with texts; print materials may offer a more conducive environment for this process by minimizing distractions and supporting deeper engagement. Finally, Vygotsky's Zone of Proximal Development (1978) highlights the importance of scaffolding in helping learners progress from partial to higher-level comprehension. The presence of Fair and Poor readers in the digital group suggests that additional instructional support is necessary to bridge gaps in comprehension, while the stronger outcomes in print reading indicate that learners were more consistently operating within or beyond their ZPD. Taken together, these theoretical perspectives explain why print materials fostered more consistent high-level comprehension, while digital texts introduced greater variability in learner performance.

Reading Retention Level - Learners' retention scores were analyzed after a set interval following the reading of the assigned text. Scores were interpreted using the 5-point rating scale (Excellent, Very Good, Good, Fair, and Poor) as shown in the table below.

Table 4

Reading Retention Level of Learners When Using Digital and Print

Reading Materials	Retention Level	Frequency (*f*)	Percentage (%)
	Excellent (17-20)	10	35.7%
	Very Good (13-16)	4	14.3%
Digital English Text	Good (9-12)	7	25.0%
	Fair (5-8)	5	17.9%
	Poor (1-4)	2	7.1%
	Total	56	100%
	Excellent (17-20)	15	53.6%
	Very Good (13-16)	7	25.0%
Print English Text	Good (9-12)	2	7.1%
	Fair (5-8)	4	14.3%
	Poor (1-4)	0	0%
	Total	56	100%

The retention results reveal distinct patterns in learner performance when comparing digital and print reading formats. Among learners exposed to digital English texts, 35.7% achieved Excellent retention, indicating long-

term recall and the ability to apply information across contexts. However, a notable portion fell within the Good (25.0%), Fair (17.9%), and Poor (7.1%) categories, suggesting variability in retention strength. Only 14.3% reached the Very Good level, reflecting accurate recall and concept explanation without prompts. In contrast, learners who engaged with print English texts demonstrated stronger retention outcomes, with 53.6% classified as Excellent and 25.0% as Very Good. Fewer learners fell into the Good (7.1%) and Fair (14.3%) categories, and none were rated Poor. These results suggest that print materials more consistently support high-level retention, while digital formats may present challenges that affect memory consolidation.

According to Dual Coding Theory (Paivio, 1986), retention improves when verbal and visual information are processed through complementary channels. Print texts, being primarily verbal and less visually distracting, allow learners to encode information more deeply and retrieve it more reliably. In contrast, digital texts often include visual elements, hyperlinks, and screen-based navigation that may split attention and reduce encoding efficiency. Cognitive Load Theory (Sweller, 1988) further explains that digital formats can increase extraneous cognitive load due to interface complexity, scrolling demands, and multitasking tendencies. This overload can interfere with working memory and hinder the transfer of information to long-term storage. The higher retention scores in print reading suggest that learners experienced lower cognitive strain and more focused engagement, enabling better recall and application. These findings highlight the importance of format selection in instructional design, especially when retention is a key learning objective.

Table 5
Statistical Analysis of Digital vs. Print Reading on Comprehension and Retention

Variable	Reading Format	Mean Score	Standard Deviation	t-value	p-value	Interpretation
Reading Comprehension	Digital Text	11.8	3.55	-1.27	0.208	Not statistically significant
	Print Text	12.9	2.92			
Reading Retention	Digital Text	11.3	4.72	-1.48	0.014	Not statistically significant
	Print Text	12.9	3.01			

An independent samples t-test was conducted to compare the reading comprehension and retention scores of learners exposed to digital and print modalities. For reading comprehension, results showed that learners using print texts had a higher mean score (12.9) and (SD = 2.92), than those using digital texts (11.8) and (SD = 3.55) but the difference was not statistically significant, as indicated by a t-value of -1.27 and a p-value of 0.208 which exceeded the 0.05 threshold, indicating that the observed difference may be attributed to random variation rather than a true effect of reading format. Similarly, for reading retention, print text users again scored higher mean (12.9) and (SD = 3.01) compared to digital text users (mean of 11.3) and SD = 4.72), yet the difference was also not statistically significant (t-value of -1.48, p-value of 0.014). Both null hypotheses stating that there is no significant difference in comprehension and retention between digital and print formats were accepted. This suggests that while print materials show slightly better average performance in both areas, the differences are not strong enough to be considered statistically meaningful within this sample.

4. Conclusions

This study investigated the comparative effects of digital and print reading modalities on the comprehension and retention of Grade 11 HUMSS learners at Osias Educational Foundation, Inc. Findings revealed that while both formats can support literacy development, print reading consistently fostered stronger comprehension and more stable retention outcomes. Learners who engaged with printed texts demonstrated deeper focus, reduced distractions, and greater ability to consolidate information into long-term memory. Although statistical analysis confirmed no significant differences between the two groups, the consistent advantage of print reading underscores its pedagogical value in academic contexts. This suggests that while print groups scored slightly higher, differences may be due to random variation rather than a true effect of reading format, and that both formats can support learning effectively under appropriate conditions. Print materials provide opportunities for annotation, reflection, and deliberate pacing, which are essential for cultivating higher-order thinking skills such as analysis, synthesis, and evaluation.

Based on these findings, the study recommends the adoption of print-based reading instruction as a core strategy for strengthening comprehension and retention among senior high school learners. Structured print reading activities such as guided annotation, story mapping, and reflective questioning should be integrated into classroom practice to maximize learning outcomes. At the same time, digital texts may be used as supplementary tools for engagement and accessibility, ensuring a balanced approach that prepares learners for both traditional and modern learning environments.

Recommendations - Considering the findings, the following recommendations are offered:

For Learners: Learners should prioritize print reading for academic tasks that require deep comprehension and long-term retention. Engaging in practices such as annotation, summarization, and reflective questioning can significantly strengthen their understanding of the material. Additionally, learners should strategically use digital texts for quick access and interactive engagement but balance these with traditional print study habits to ensure comprehensive learning.

For Teachers: Teachers are encouraged to incorporate print-based strategies like story mapping, guided questioning, and recall activities into their lessons to enhance students' comprehension and retention skills. Print texts should be used primarily for tasks that focus on long-term retention, while digital materials can serve as supplementary tools for engagement and interactivity. Implementing the Print-Based Reading Instruction for Higher-Order Thinking Skills (PRI-HOTS) program is recommended to systematically develop students' analysis, evaluation, and synthesis skills.

For School Administrators: School administrators should institutionalize print-based reading programs within the HUMSS curriculum to ensure that learners benefit from structured and effective reading practices. Ensuring equitable access to printed resources, particularly for students from low-income households, is crucial. Supporting teacher training on blended literacy strategies that balance both print and digital modalities will help create a comprehensive educational environment.

For Curriculum Planners and Policymakers: Curriculum planners and policymakers should recognize the enduring value of print reading in literacy development. They are encouraged to align reading enhancement programs with national mandates for quality education and 21st-century skills, ensuring that these programs meet both traditional and contemporary learning needs. Encouraging blended approaches that integrate the strengths of both print and digital formats can provide a balanced educational experience.

For Future Researchers: Future researchers should expand their scope to include other strands, grade levels, or disciplines to validate findings across various contexts. Investigating the long-term effects of print-based programs on academic performance would be valuable in understanding their sustained impact. Exploring how multimedia and adaptive technologies can complement print reading without diminishing retention could also provide insights into enhancing learning outcomes.

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