



## EXPLORING UNIVERSITY STUDENTS' PERCEPTION AND PREFERENCE IN READING DIGITAL AND PRINTED TEXTS

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### Abstract

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The rapid shift to digital learning media has sparked debate over which medium students prefer and understand better for reading. Digital texts provide easier access and convenience; however, studies increasingly indicate cognitive costs associated with such Reading for deeper processing. This study explores university students' attitudes and preferences toward digital versus print Reading, with a particular focus on the attitudes and life experiences associated with each format. Using a mixed-methods design, questionnaire data were gathered from 62 ELLs and supported by semi-structured interviews with several participants. The results support a clear preference for printed text, especially when reading for prolonged periods and annotating. Surveyed students are not alone in reporting that concentration, comprehension, and memory retention all improve when reading from printed rather than digital materials because of extraneous cognitive load; dual-processing theories suggest that more extraneous mental effort may be required in a written rather than a digital environment. However, the research suggests that students find digital texts convenient for Reading preparation and for flexible contributions to seminar discussion. Differences among these perceptions highlight the interaction among cognitive, affective, and situational factors that influence Reading preferences. The research concludes that the two formats have complementary roles; however, hard copy remains preferred for extended academic Reading. Pedagogical implications: Students can benefit from format-specific Reading approaches in order to maximize their gains.

**Keywords:** Reading Preferences; Reading Digital Texts; Printed Texts; Cognitive Processing

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## INTRODUCTION

While Reading has traditionally been associated with printed materials, rapid technological advancement has transformed how learners access written information (Banaz, 2025). As Liu (2005) states, "Reading practice are undergoing rapid changes as digital environments reshape how people access, process, and use information". The widespread integration of digital media in educational settings has expanded students' exposure to digital text, offering unprecedented convenience and instantaneous access to information. Students increasingly favor digital texts for their accessibility and flexibility (Alamri, 2019). Nevertheless, printed text continues to hold significant value in an

academic context, particularly for tasks requiring sustained attention and deeper levels of comprehension.

Research examining printed and digital Reading materials has produced varied insights. Manalu (2019) determined that students exhibited a heightened level of interest in the utilization of digital texts. This inclination was primarily attributable to the frequent assignment of digital readings by lecturers, as well as the students' technological proficiency. Several scholars highlight additional benefits of digital Reading, including ease of access, flexibility, affordability, and the ability to read anytime and anywhere (Amirtharaj et al., 2023). However, digital Reading also has several drawbacks. Readers often experience reduced comprehension, difficulty highlighting and annotating, increased distractions, and physical discomfort such as eye strain (Divya & Haneefa, 2020). Carr in Ivić (2019) further argues that digital environments may hinder readers' ability to grasp main ideas in longer texts, as digital platforms encourage rapid shifting between pieces of information. Consequently, digital Reading may pose challenges for understanding complex or lengthy academic materials.

Conversely, numerous studies show that printed text offers cognitive advantages that support deeper comprehension. Ross et al. (2017) found that students who used printed materials tended to demonstrate stronger understanding. Divya & Haneefa (2020) similarly report that printed texts promote better focus, greater material absorption, and higher comfort levels. Students also perceive printed materials as more suitable for annotation, highlighting, and applying varied reading techniques (Johnston & Salaz, 2019; Al-Seghayer & Mohammad, 2024). This preference becomes especially pronounced when students engage with dense or conceptually challenging texts. As Singer & Alexander (2017) emphasize, the choice between print and digital reading is shaped by reading purpose, task complexity, and text length.

Despite the growing adoption of digital reading, research constantly highlights those printed materials may promote more intensive cognitive engagement. Printed text provides a tangible and immersive reading experience that supports comprehension, memory, and critical processing of information. Merchant (2021) argues that the linearity of print encourages sustained focus, a key component for academic reading. Similarly, Seok & DaCosta (2016) emphasize that printed materials facilitate traditional note-taking and annotation practice, which remain essential strategies for deep learning. These advantages explain why many students continue to rely on printed materials for academic assignments that demand analytical engagement.

To address this gap, the present study investigates university students' perception and preferences regarding digital and printed text, with emphasis on their ease of understanding and comprehension. By examining how students evaluate these two formats in relation to their academic needs, this research contributes to a deeper understanding of reading practice in contemporary learning environments. The findings are expected to inform lecturers, curriculum developers, and educational policymakers in selecting and integrating reading materials that maximize student engagement and learning outcomes.

## **METHODS**

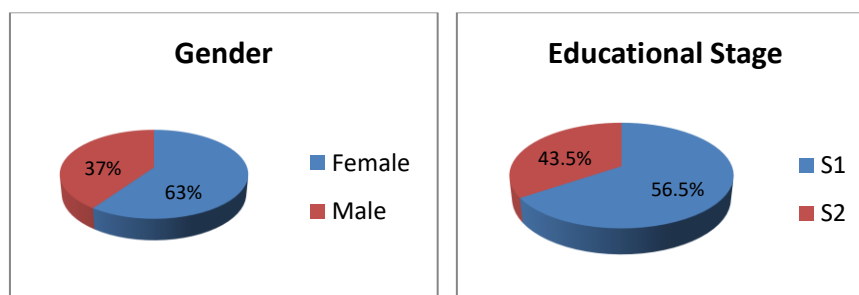
To address the research question, this study employed a mixed-methods approach, combining both quantitative and qualitative data to ensure a comprehensive understanding of the research problem. The quantitative data were obtained through a questionnaire designed to measure students' perceptions and preferences toward digital

and printed reading materials. Meanwhile, qualitative data were collected through interviews, which complemented and deepened the interpretation of the quantitative findings. This design aligns with a descriptive qualitative framework in which the researchers aim to describe a particular phenomenon in detail to capture the underlying meanings (Daruhadi, 2024). The participants in this study were 62 students from four English Departments (EDs) in three cities in East Java, Indonesia: Jember, Madura, and Malang. Of these participants, 35 were undergraduate (S1) students and 27 were graduate (S2) students. Regarding gender distribution, 39 participants were female and 23 were male.

Regarding data collection instruments, the researchers utilized a questionnaire and semi-structured interviews. The questionnaire was adapted from Johnston & Salaz (2019) and consisted of 15 initial items. To enhance comprehensiveness, the researchers developed six additional items, bringing the total to 21. All items employed a five-point Likert scale to capture the respondents' degree of agreement. The questionnaire aimed to collect primary data concerning students' perceptions and preferences in reading digital versus printed texts. After collecting questionnaire data from all 62 participants, interviews were conducted with 10 volunteers. The interview data functioned as secondary data, intended to strengthen the reliability of the primary findings and provide richer interpretative insights. Quantitative data obtained from the questionnaire were analyzed using descriptive statistics to calculate frequencies and percentages. These numerical results, presented in the Findings and Discussion section, highlight key aspects related to students' reading perceptions and preferences. From the 21 questionnaire items, this research focused on four core aspects: (1) reading comfort, (2) reading preference, (3) ease of understanding, and (4) support for comprehension.

## RESULTS & DISCUSSION

This section presents and discusses research findings obtained from primary and secondary data analysis. Before presenting students' perception, preference, and understanding, as well as their reading strategies, the researchers consider it necessary to present the research participants' demographic data.



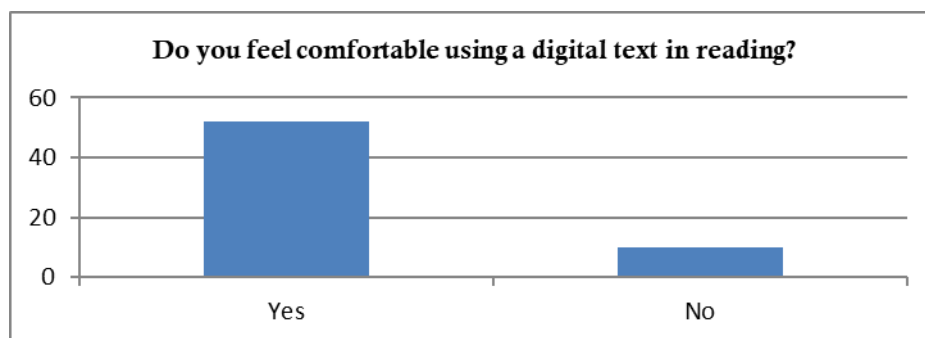
**Figure 1.**  
Students' Gender and Educational Level

As noted earlier, 62 university students took part as research subjects in the present study. As shown in Figure 1, there are 39 female students (63%) and 23 male students (37%). In terms of educational level, 35 subjects (56.5%) are undergraduate/S1 students, and 27 subjects (43.5%) are graduate/S2 students. The unequal numbers of research subjects by gender and educational level are beyond the researchers' control. And yet, by

obtaining female and male participants as well as undergraduate and graduate students as research subjects, the researchers expect to obtain higher objectivity of research findings, and hence a better picture of the phenomenon under investigation.

### Students' Perception of Digital and Printed Texts

In response to the question Do you feel comfortable using a digital text in reading? students' answers fall into two big categories: 52 of them (84%) say 'yes' and 10 of them (16%) say no (see Figure 2). These answers clearly indicate that most students feel comfortable reading digital texts.



**Figure 2.**  
Students' perception on digital texts in reading

Student Perception of digital and printed reading materials reflect a complex negotiation between convenience, cognitive experience, and perceived learning benefits. The quantitative findings reveal that 84% of students report feeling comfortable using digital texts, indicating that digital reading has been normalized as part of their academic routines. Interview data further illustrate that students appreciate digital texts because they are continually updated, immediately accessible, and perceived as more engaging or "different" in atmosphere. These insights echo those of Amirtharaj et al. (2023), who note that digital reading offers practical advantages such as portability, affordability, and the ability to access information anytime, anywhere. Syaputri (2017) similarly highlight the sense of exploratory engagement students feel when navigating digital materials.

Although digital texts are largely perceived positively, this comfort is not synonymous with deeper learning. In their explanations, students consistently frame digital reading in terms of external affordances, such as ease of access, the availability of updated information, and mobility. This aligns with Affordance Theory Gibson (1979) which suggests that a medium's perceived usefulness emerges from the actions it enables. Digital texts afford rapid searching, quick navigation, and instant retrieval of new information, which appeals to learners operating in fast-paced academic environments.

However, students also implicitly recognize cognitive limitations associated with digital reading. Several participants describe digital reading as convenient but potentially distracting, echoing contemporary research on the cognitive ecology of digital reading W. Liu et al. (2022). Cognitive Load Theory Sweller (2011) helps explain this tension: although digital reading offers functional conveniences, it also introduces extraneous cognitive load in the form of screen glare, scrolling, notification interruptions, and reduced tactile feedback. These environmental factors can constrain working memory and hinder efficient cognitive processing, even if students do not explicitly articulate them.

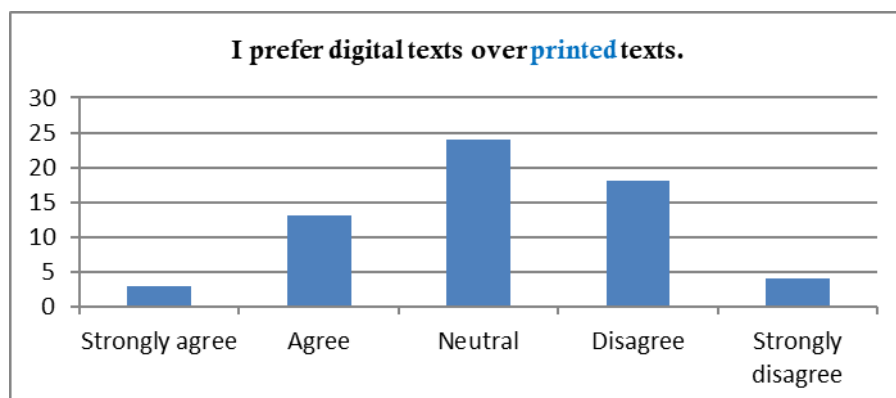
The preference for digital reading in short, informational, or fast-paced tasks suggests that students assign distinct cognitive roles to each medium. Digital reading

appears to correspond with the "surface-level reading" practices delineated by Liu (2005). These surface-level reading practices entail scanning, updating, and expeditious information retrieval. These cognitive behaviors rely heavily on dual-processing mechanisms, exceptionally rapid visual decoding and minimal deep integration (Clark & Paivio, 1991). Students' perception that digital reading feels more "dynamic" and "updated" reflects alignment with these task-specific cognitive strengths.

Thus, students' perceptions do not simply reflect personal preference but reveal an emerging literacy pattern shaped by academic demands, cognitive processing tendencies, and technological affordances. Overall, digital reading is perceived as practical and enjoyable, but not necessarily optimal for tasks requiring sustained concentration or deep comprehension. This duality forms the conceptual foundation for understanding their subsequent preferences and comprehension outcomes.

### Students' Preference for Digital and Printed Texts

Students' preference for digital and printed reading materials exhibits a nuanced, context-dependent pattern. Although 45% indicate a preference for digital reading when neutral responses are divided proportionally, a slightly higher proportion (55%) favors printed texts. The interviews reveal that the majority of students adopt a conditional preference: they choose digital texts for short, accessible, and time-sensitive reading tasks, but prefer printed materials for longer, complex, or academic readings. This conditionality reflects a sophisticated metacognitive awareness of how different media influence their cognitive engagement and comfort.



**Figure 3.**  
Students' preference for digital and printed texts

One student noted: "It depends on the condition... For digital texts I can read anytime and anywhere, but for printed texts I can take notes and understand better." This reflects media-matching principles described by Singer & Alexander (2017), who argue that reading medium selection is strongly determined by reading purpose, text length, and task complexity. The students' selection of reading materials is consistent with Media Richness Theory (Ishii et al., 2019), which posits that individuals select communication tools, or in this case, reading media, based on their capacity to process complex information. Printed texts, with their tactile stability and visual constancy, are perceived as "richer" for deep learning tasks.

The data show that when reading materials exceed approximately eight pages, students overwhelmingly prefer printed formats. This preference corresponds to Spatial Memory Theory Mangen & Weel (2015), which emphasizes that physical page-turning,

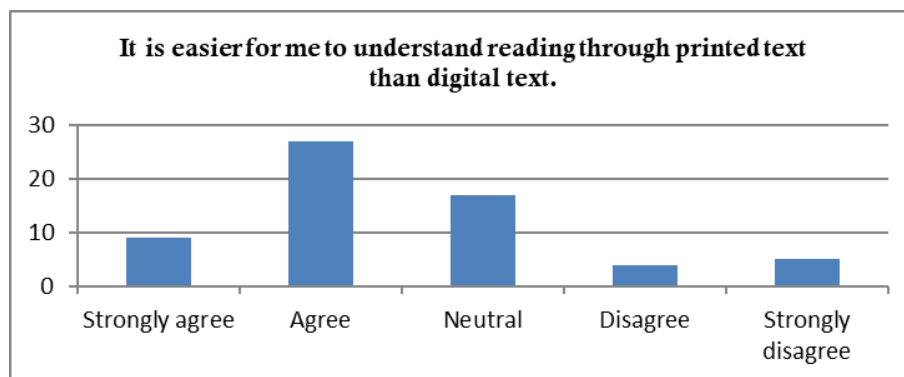
spatial text placement, and tactile cues support mental mapping. Students confirm this through comments about remembering “where things are on the page,” a cognitive advantage absent in the continuous scroll of digital environments.

Annotation practices also strongly influence preference. Students consistently report difficulty highlighting or writing marginal notes in digital formats unless additional applications are installed. This aligns with Mizrachi’s research in Johnston & Salaz, (2019), which shows that the inability to annotate naturally in digital environments negatively influences both preferences and comprehension. The preference for printed materials partially emerges from their affordance for embodied interaction, reflecting theories of embodied cognition (Barsalou, 2008). The physical actions of holding, marking, or turning pages become cognitive extensions that reinforce understanding.

However, students also acknowledge the physical discomforts associated with prolonged digital reading, such as eye strain. The validity of this claim is supported by the research of Divya & Haneefa (2020). These challenges reinforce the idea that, despite its convenience, digital reading may carry physiological and cognitive costs that influence preferences when reading demands intensify. Overall, students’ preferences represent a balanced negotiation between practicality and cognitive depth. Digital reading is preferred for efficiency and mobility, while printed reading is preferred for comprehension, annotation, and sustained engagement. This dual preference structure underscores the medium-specific affordances that shape reading behavior in contemporary academic contexts.

### Students’ Understanding of Digital and Printed Texts

Students’ understanding of reading materials across digital and printed formats demonstrates a clear pattern grounded in their cognitive experiences, reading behaviors, and perceived learning outcomes. The questionnaire data show that 72% of students agree that printed texts are easier to understand, while only 28% report experiencing equal or greater comprehension through digital texts. This strong preference for print-based comprehension is further reinforced by the second item, which reveals that 84% of students believe printed texts better support memory, learning, and comprehension. These quantitative results are consistent with qualitative statements gathered through interviews, in which students repeatedly emphasized that printed materials allow them to focus more effectively, recall information more easily, and engage more deeply with the content.



**Figure 4.**

Students’ perception on understanding using printed and digital texts

Students’ explanations show that printed texts are perceived as promoting cognitive clarity because they enable note-taking, annotation, underlining, and margin comments, all of which serve as scaffolding for comprehension. One participant stated: “I feel that I

understand better when using printed texts. I can take notes and comment on them, and it helps me remember the material.” This aligns with Divya & Haneefa (2020), paper-based reading facilitates superior comprehension, focus, and information absorption. The students’ perceptions also reinforce Ross et al. (2017) argument that printed texts are associated with stronger comprehension outcomes because they support sustained attention and reduce cognitive interference.

From a theoretical standpoint, students’ greater comprehension of printed texts aligns with principles articulated in Cognitive Load Theory (Sweller, 2011). According to the theory, learning improves when extraneous cognitive load is minimized. Digital reading environments, which often include scrolling, notifications, hyperlinks, and screen luminance, introduce additional external demands that increase cognitive load and reduce working memory efficiency. The students’ comments, particularly those regarding eye strain, difficulty focusing on screens, and challenges maintaining attention, suggest that digital formats impose a greater extraneous load, thereby limiting comprehension. Conversely, printed materials provide a stable and distraction-free environment, allowing students to allocate more cognitive resources to intrinsic and germane processing.

Students’ perceptions also align with Dual-Processing Theory (Clark & Paivio, 1991), which posits that verbal and visual information are processed through complementary channels. Printed texts support dual processing by providing fixed visual layouts, consistent spatial locations, and predictable formatting, thereby enhancing memory consolidation. Meanwhile, digital texts, especially those requiring scrolling, disrupt spatial constancy and visual mapping. This disruption makes it more difficult for learners to retrieve information because they lack the stable visual anchors that printed texts naturally provide. Evidence of this appears in students’ statements describing how they “remember the location of information on the printed page,” indicating reliance on spatial cues. This phenomenon further reflects the principles of Spatial Memory Theory Mangen & Weel (2015), which suggest that the physicality of printed pages supports the mental mapping of text structure. When students flip pages, underline sections, or physically navigate a text, they build tactile and spatial associations that support comprehension and recall. Digital texts, by contrast, compress information into a non-linear, scroll-based interface, weakening spatial memory cues. Students’ reported difficulty recalling digitally read material, therefore, corresponds with theoretical expectations regarding how the medium shapes cognitive processing.

Interestingly, a small group of students (28%) reported better understanding through digital texts. Their responses typically referred to the usefulness of zoom functions, built-in dictionaries, or rapid search features, suggesting that digital comprehension improves when reading tasks require decoding unfamiliar vocabulary or skimming for specific information. This subgroup reflects the task-dependency principle described by Singer & Alexander (2017), who argue that medium effectiveness varies depending on reading goals and text complexity. For shorter, simpler, or informational texts, digital tools may enhance comprehension. However, for longer and conceptually dense academic texts, the printed medium remains superior for most learners.

Overall, the findings indicate that students’ understanding is shaped not only by medium-related characteristics but also by broader cognitive mechanisms associated with attention, memory, and processing demands. The strong preference for printed texts in tasks requiring comprehension, retention, and deep learning reflects an alignment between students’ subjective experiences and established cognitive theories. These results reaffirm the continued relevance of printed materials in academic settings, particularly in contexts where sustained concentration and conceptual integration are critical.

The relationship between reading modality and comprehension has long been a topic of discussion across cognitive and educational research. Many scholars argue that printed texts provide cognitive advantages because they require less extraneous processing and offer more substantial support for deep comprehension. The stable spatial layout of print reduces unnecessary cognitive load and enhances mental mapping, enabling readers to form more explicit structural representations of the text (Li et al., 2013; Singer & Alexander, 2017). Print also facilitates tactile interaction, such as flipping pages, annotating margins, and visually locating information. This, in turn, strengthens spatial memory and facilitates the integration of ideas across text segments (INKE et al., 2012). These characteristics help explain why many learners consistently report greater focus, comprehension, and comfort when reading printed materials (Divya & Haneefa 2020; Ross et al., 2017). However, an expanding body of research highlights the affordances of digital reading, especially in technology-rich learning environments. Digital texts offer portability, instant retrieval, multimodal features, and adjustable interfaces that can support diverse learning preferences. Such affordances may reduce intrinsic load for some readers and foster efficient processing when tasks require quick navigation or flexible engagement (Ackerman & Goldsmith, 2011). For digitally fluent learners, screen-based reading can enhance motivation and autonomy, suggesting that positive experiences with digital learning tools can shape perceptions over time.

Despite these strengths, digital reading remains contested within the literature. Several studies find that comprehension on screens is often shallower due to reduced metacognitive monitoring, increased susceptibility to distraction, and a tendency to skim rather than engage deeply (Delgado & Salmerón, 2021; Ivić, 2019). Even when digital texts are convenient, some learners perceive them as less effective for absorbing complex information or sustaining concentration over extended periods. This pattern persists even in contexts where students are accustomed to digital technologies, indicating that familiarity alone does not guarantee deeper learning on screens.

The coexistence of these complementary and contradictory findings underscores the complexity of reading in contemporary learning environments. Preferences and comprehension outcomes are shaped not only by the medium itself but also by cognitive load demands, prior experiences, spatial navigation habits, and cultural reading practices (Mangen & Weel, 2015). As digital integration becomes increasingly embedded within higher education, understanding how learners negotiate these modalities becomes even more important. Within this evolving landscape, the present study contributes to ongoing scholarly conversations by examining Indonesian EFL learners' perceptions of comprehension, memory, and engagement with digital and printed texts. By situating the findings in a context where digital tools are rapidly expanding yet print-based learning traditions remain strong, the study offers a nuanced perspective that enriches theoretical debates and highlights the continuing relevance of modality-sensitive approaches to reading pedagogy.

## **CONCLUSION**

This study examined university students' perceptions and preferences regarding digital and printed texts as reading media, revealing a complex interplay between convenience, cognitive engagement, and learning expectations. While students acknowledged the practicality and accessibility of digital materials, they consistently perceived printed texts as more supportive of comprehension, memory retention, and focused engagement. These preferences align with cognitive theories suggesting that the



stable spatial structure and reduced extraneous load of printed materials enhance metacognitive monitoring and deep processing. The findings also indicate that even digitally proficient learners may not fully benefit from screen-based reading when tackling demanding academic tasks, reinforcing ongoing debates in the literature. At the same time, the study highlights emerging contradictions within student experiences. Although printed texts are valued for cognitive clarity, digital reading is increasingly normalized through pedagogical practices, institutional requirements, and learners' technological fluency. This duality reflects a transitional moment in contemporary reading culture, in which students navigate between cognitive efficiency and digital practicality. Such tensions underscore that reading modality preferences cannot be reduced to technological familiarity alone but are shaped by task complexity, reading purposes, and individual processing strategies.

The study contributes to broader theoretical discussions by demonstrating how modality-specific cognitive demands manifest in the perceptions of EFL learners in an Indonesian higher-education context, where digital adoption is accelerating but print-based academic traditions remain robust. The findings thus reinforce the need for nuanced, context-sensitive approaches to reading pedagogy that acknowledge both the strengths and limitations of each medium. Moving forward, institutions and educators may consider designing reading tasks that strategically integrate both print and digital modalities to optimize learning outcomes. Future research may explore how multimodal reading strategies develop over time, how digital annotation tools could be improved to approximate the cognitive benefits of print, and how modality preferences interact with proficiency levels, reading purposes, and disciplinary expectations. As reading practices continue to evolve, a balanced understanding of both media will remain essential for supporting effective, deep, and meaningful learning..

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