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The Impact of Digital Literacy on Students' Reading Comprehension in the 21st Century Classroom

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Abstract

In the digital age, reading comprehension involves more than understanding printed text; it requires the ability to navigate, evaluate, and interpret digital content. As digital media becomes increasingly prevalent in education, students must develop digital literacy skills to comprehend online information effectively. However, the impact of digital literacy on reading comprehension remains underexplored in many educational settings. Grounded in new literacies theory and constructivist learning theory, this study investigates the relationship between students' digital literacy and their reading comprehension performance in digital contexts. Using a mixed-methods design, data were collected from 120 high school students through a digital literacy assessment and a reading comprehension test. The results show a significant positive correlation between digital literacy and reading comprehension, particularly among students who frequently engage with digital texts. These findings suggest that students who possess higher digital literacy are better equipped to understand and analyze digital reading materials. The study highlights the growing importance of digital literacy as an essential component of reading comprehension in the 21st-century classroom. It implies that reading instruction should not only focus on traditional skills but also incorporate digital strategies to enhance students' academic outcomes and real-world literacy preparedness.

Keywords: 21st-century skills, digital literacy, new literacies theory, reading comprehension, secondary education

Introduction

The integration of technology in education has transformed how students engage with reading materials. In today's digital era, the traditional boundaries of literacy have expanded to include digital platforms, requiring learners to not only read but also critically evaluate and navigate multimedia and hyperlinked texts. This shift underscores the growing significance of digital literacy—the ability to effectively find, interpret, evaluate, and communicate information using digital technologies (Ng, 2012). With the rapid growth of digital content, the way students access, process, and understand information has fundamentally changed. Unlike linear print texts, digital reading often involves navigating through hyperlinks, interpreting visual and interactive elements, and distinguishing between credible and non-credible sources, which requires a unique set of skills.

Reading comprehension, a foundational academic skill, is increasingly tested in digital formats. Students encounter diverse digital reading environments, from e-books to online articles, blogs, and academic databases. These formats demand additional cognitive and technical skills compared to traditional print-based reading (Leu et al., 2014). As such, digital literacy becomes a key factor influencing how students comprehend information. Digital reading comprehension involves multiliteracy skills, including scanning for keywords, synthesizing content across different sources, and assessing the relevance of multimedia. Furthermore, students must be capable of critical filtering to combat misinformation and overload in online environments.

Globally, education systems are evolving to incorporate 21st-century skills such as critical thinking, information literacy, and digital fluency. The OECD (2019) emphasizes the need for preparing students to navigate complex digital environments where they must evaluate the credibility and relevance of online content. However, while the importance of digital literacy is widely acknowledged, its direct impact on reading comprehension has received limited empirical attention, especially in developing countries where access to technology and training varies. The digital divide in these regions presents unique challenges in digital skill acquisition and equitable access to online learning resources.

Despite this trend, research has predominantly focused on reading comprehension in print contexts. Limited studies address how digital literacy directly contributes to students' ability to comprehend digital texts (Hobbs, 2017; Coiro, 2011). This creates a knowledge gap in understanding the academic consequences of digital reading. With the increasing reliance on online learning platforms, this gap has become more urgent to address. In many cases, students are expected to adapt to digital reading without explicit instruction in navigating online formats, evaluating sources, or interpreting non-linear structures. Therefore, there is a pressing need to understand how well students are equipped for these tasks and what instructional support is necessary to foster digital comprehension.

This study aims to investigate the relationship between digital literacy and reading comprehension among high school students. Grounded in New Literacies Theory (Leu et al., 2004) and Constructivist Learning Theory (Vygotsky, 1978), this research explores

whether students equipped with stronger digital skills perform better in reading comprehension tasks. Identifying this relationship may contribute to more effective integration of digital literacy into reading instruction and curriculum design. Moreover, the study addresses a critical aspect of educational equity, suggesting that without intentional digital literacy instruction, some students may be left behind in academic achievement due to limited digital exposure and practice.

Methods

A mixed-methods approach was adopted to explore the relationship between digital literacy and reading comprehension. This design allowed for both quantitative measurement and qualitative insight into student behaviors.

Participants The study involved 120 high school students aged 15–17 from two urban schools in Indonesia. Participants were selected using stratified random sampling to ensure diversity in academic achievement and technology access. The sample included students from different socioeconomic backgrounds to reflect a wider spectrum of digital access and proficiency. Parental consent and school approval were obtained to ensure ethical compliance.

Instruments Two main instruments were used:

1. Digital Literacy Assessment – Adapted from Ng (2012), this instrument assessed students' competencies in information navigation, evaluation of online sources, and digital content creation. The assessment included 24 multiple-choice items, divided into three sub-categories: technical skills, cognitive skills, and ethical understanding in digital contexts.
2. Reading Comprehension Test – Developed using standardized digital texts (e.g., online articles with hyperlinks and multimedia), the test measured students' ability to understand main ideas, infer meaning, and critically analyze content. It consisted of 20 multiple-answer questions. The texts were selected to represent common digital genres students might encounter in academic settings.

Procedure Data collection occurred in two sessions. First, students completed the digital literacy assessment. In the second session, they completed the reading comprehension test. Both sessions were supervised and conducted in a computer lab environment to simulate real digital reading conditions. Students were given 45 minutes for each test, and all instructions were standardized to maintain consistency.

Data Analysis Quantitative data were analyzed using SPSS. Descriptive statistics (mean, standard deviation) summarized student performance. Pearson’s correlation coefficient was used to examine the relationship between digital literacy and reading comprehension

scores. A regression analysis was also conducted to determine the extent to which digital literacy predicted reading comprehension outcomes.

Qualitative data from classroom observations and open-ended student responses were analyzed using thematic coding. This identified patterns in how students interacted with digital texts, such as link-following behavior, critical source evaluation, use of multimedia cues, and problem-solving strategies while navigating unfamiliar websites.

Findings and Discussion

The quantitative results revealed a moderate to strong positive correlation ($r = 0.63$, $p < 0.01$) between students' digital literacy scores and their reading comprehension performance. Students with higher digital literacy consistently scored better in comprehension tasks, especially when the texts included hyperlinks, multimedia elements, or required source evaluation. The regression analysis showed that digital literacy accounted for approximately 40% of the variance in reading comprehension scores. This is a significant indicator that digital competence influences students' capacity to extract meaning from online materials. Importantly, the findings held true across various subgroups, including gender and socioeconomic status, suggesting the universality of the digital literacy effect.

Thematic analysis of observational data supported these findings. Students with high digital literacy demonstrated effective reading strategies, including identifying reliable online sources, using digital annotations, and navigating hypertext with purpose. These students showed a deeper engagement with digital content, often integrating information from multiple sources and rechecking facts before making inferences. In contrast, students with lower digital literacy often skipped multimedia elements, clicked indiscriminately through hyperlinks, or failed to assess the credibility of online content, which negatively impacted comprehension. This group also displayed signs of cognitive overload, such as frequently losing track of the main idea or misinterpreting visual cues.

These results align with Leu et al.'s (2014) assertion that digital reading requires a distinct set of literacy practices. Moreover, the findings confirm that reading in digital environments is not simply a transfer of print-based skills but involves new cognitive strategies and behaviors (Coiro, 2011). The ability to comprehend digital texts demands metacognitive awareness, including knowing when to slow down, how to use hyperlinks constructively, and how to judge the authenticity of sources. This supports the growing recognition that education must adapt its literacy instruction to meet the demands of digital contexts.

The study also supports Vygotsky's (1978) constructivist theory, highlighting the importance of social and contextual learning. Students who regularly engaged with digital

texts outside school (e.g., blogs, forums, educational platforms) were more adept at handling academic digital texts. This suggests that frequent exposure to digital environments strengthens comprehension strategies through active, self-directed learning. Furthermore, peer collaboration and discussion around digital content often provided students with additional insights, indicating that digital comprehension may benefit from collaborative learning models.

Additionally, students who reported higher confidence in their digital abilities tended to demonstrate better problem-solving strategies when facing unfamiliar digital tasks. This suggests that digital self-efficacy, as an affective component, may play a role in facilitating comprehension. Teachers can play a pivotal role in fostering this confidence by designing learning tasks that progressively build digital competencies. For instance, integrating scaffolded assignments that require online research, source evaluation, and multimedia synthesis can gradually build both skills and confidence in digital contexts.

These findings underscore the importance of embedding digital literacy instruction within the reading curriculum. Teaching students how to evaluate online sources, follow hypertext, and critically engage with digital information can significantly enhance their reading comprehension outcomes. Moreover, educators should consider the diversity of students' digital exposure and provide equitable opportunities to develop these competencies in formal learning environments. Furthermore, digital literacy can support equity in learning by empowering students from less advantaged backgrounds to develop the skills necessary to succeed in digital academic environments. This is particularly relevant in light of the global shift toward blended and remote learning models, which require students to independently navigate online materials with a high degree of digital competence.

Conclusion

This study concludes that digital literacy is a significant predictor of reading comprehension in digital environments. High school students with stronger digital skills are more capable of understanding and critically analyzing online texts. The findings highlight the need for schools to explicitly incorporate digital literacy training into reading instruction.

Limitations of this study include its focus on a specific age group and cultural context. Further research should investigate whether these findings apply to younger learners, different countries, and students with limited access to technology. In addition, this study did not explore the role of teacher practices or school-wide digital policies, which may also influence student outcomes.

Recommendations for future research include longitudinal studies that track the development of digital reading skills over time and interventions that assess the impact of digital literacy-focused instruction on reading outcomes. Future studies could also explore how digital literacy interacts with other cognitive or motivational factors, such as metacognition, attention, and academic self-efficacy.

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