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Do the Modules Meet the Need? A Study of Students' Reading Text Skills in the Digital English Era

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Abstract

This study addresses the crucial issue of low reading proficiency among English language students. It investigates the impact of digital modules on enhancing reading skills using a quasi-experimental quantitative design with a sample of 80 students randomly selected from a population of 450. The results, analyzed through ANOVA, reveal a significant improvement in reading skills ($p = 0.002$), with digital modules providing an effective and engaging learning tool. This research highlights the potential of technology-driven interventions in addressing literacy challenges and offers valuable insights for integrating digital modules into higher education to improve academic outcomes.

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INTRODUCTION

The paradigm shift in education has increasingly embraced student-centered learning approaches, as evidenced by the Merdeka Curriculum introduced by the Indonesian government (Rodney, 2020). This curriculum emphasizes the importance of tailoring teaching methods to students' unique abilities and characteristics, particularly in fostering continuous improvement in reading skills. Reading skills are foundational to academic success as they serve as the gateway to understanding and engaging with various forms of information across disciplines (Fiorentzi & Antoniou, 2023; Schröter & Bar-Kochva, 2019). To support this shift, learning modules have emerged as essential tools, offering structured and adaptable content that facilitates skill development, particularly in reading comprehension (Aulia & Yuliani, 2023; Hasanah et al., 2019; Netriwati et al., 2023). By integrating strategies to enhance critical reading abilities, these modules address the increasing demand for literacy skills in higher education.

The rapid advancement of technology and globalization has further amplified the need for innovative educational solutions. Within the Society 5.0 framework, where technology and human-centered approaches converge, higher education institutions are expected to equip graduates with adaptability and critical skills to navigate a disruptive global environment (Knight, 2020; Singh, 2024). This transformation has redefined traditional teaching methods, transitioning from face-to-face interactions to technology-integrated learning environments (Bhowmik et al., 2019; Deshpande et al., 2024). Digital tools, including learning modules, offer educators the opportunity to create engaging and flexible learning experiences that extend beyond the classroom (Ichim, 2020; Kereluik et al., 2013). These tools not only simplify content delivery but also enhance student engagement and motivation (Syakur et al., 2023).

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Indonesia's low performance in international assessments such as PISA underscores the urgency of addressing literacy challenges (Anandari & Iswandari, 2019; Darihastining et al., 2021; Latifah et al., 2019). Ranking among the bottom globally highlights a critical gap in reading proficiency, particularly at the tertiary level. At the institutional level, observations at Cipta Wacana Christian University of Malang reveal that 60% of students exhibit low interest in reading, as reflected in their limited use of library resources and challenges in producing quality academic papers (Sudrajad, 2024). Instead, students rely heavily on digital gadgets for information, indicating a shift in learning preferences that requires innovative interventions. To address these challenges, this study explores the potential of English digital learning modules to improve students' reading skills. Designed to provide accessible and engaging content, these modules leverage smartphones and other digital devices, enhancing flexibility and convenience in learning. By structuring activities around multimedia resources and interactive components, digital modules have the potential to transform the learning experience, encouraging active student participation and improving reading comprehension (Jeffries, 2022; Karlsson & Bradley, 2020).

Existing studies confirm the efficacy of these tools in education. For instance, several studies have highlighted their user-friendliness (Marta et al., 2023; Saragih et al., 2024; Yusuf et al., 2020). Additionally, Putri et al. (2020) found that digital modules improved students' comprehension with 71% of participants reporting either full or partial understanding of the material. These tools have also been shown to support student self-learning (Linda et al., 2020) and foster critical and creative skills (Aliyah & Widiyatmoko, 2023). These findings underscore the potential of digital modules to enhance learning outcomes across diverse contexts. Another study (Noroozi & Mulder, 2017) emphasized the importance of integrating technology into English language instruction to meet the needs of tech-savvy students. However, these studies often focus on general digital module design or implementation without directly addressing their impact on reading skills in specific contexts like English language learning for university students. This leaves a gap in understanding how such modules can be tailored to address the unique challenges of reading proficiency in higher education settings. To bridge this gap, this study explores the potential of English digital learning modules in improving students' reading skills. Unlike prior studies that focus on general comprehension or usability, this research specifically investigates how the structured integration of multimedia resources and interactive components can enhance students' reading comprehension.

In addition to their pedagogical benefits, digital modules offer practical advantages for students and educators alike. They provide a centralized platform for accessing course materials, eliminating the need for students to search for supplementary references. Furthermore, their multimedia features enhance the learning experience by making content more dynamic and interactive (Öztürk et al., 2022). For educators, digital modules represent a powerful tool for streamlining course delivery and enhancing the overall quality of instruction. By developing and implementing English digital learning modules, this study aims to bridge the gap between traditional teaching methods and the demands of a technology-driven educational landscape. The research highlights the importance of aligning instructional materials with students' needs and preferences, fostering a more engaging and effective learning environment. Ultimately, the findings of this study will contribute to ongoing efforts to improve reading skills and academic performance among university students, addressing one of the most pressing challenges in higher education today.

METHOD

Quantitative research involves systematic investigation using numerical data throughout data collection, interpretation, and analysis (Sugiyono, 2022). This study adopts a quasi-experimental quantitative method with a pre-test and post-test design (Wapa et al., 2024). The research framework includes two variables: the independent variable (VB) represented by the English Digital Module (A1) and the dependent variable (VT) represented by reading skills (A2) are presented in Table 1.

Table 1. Framework of Research Variables

VB	VT
A1	A2

VB (Independent Variable): The instructional approach using the English Digital Module (A1).
VT (Dependent Variable): Students' reading skills (A2).

The population for this study consists of all 450 students enrolled at Cipta Wacana Christian University of Malang during the odd semester of the 2023/2024 academic year. The sampling technique employed is Random Sampling, ensuring representation across the population (Lynn, 2016). The reading skills assessment instrument was developed based on grand theory and subsequently validated through expert judgment. This process ensured that the instrument accurately measured the intended constructs. The instrument comprises 20 questionnaire items scored on a scale of 1-5. The pilot testing involved a sample size of 80 students to determine validity and reliability. The analysis of validity was conducted using Microsoft Excel at a 5% significance level.

The intervention in this study was the use of a Digital Module for English Language Learning, which was designed to enhance students' reading skills. The digital module included a variety of interactive materials such as text-based exercises, video content, and interactive quizzes aimed at improving reading comprehension. The module was accessible to students through their devices, including smartphones and computers, which provided flexibility for students to engage with the material at their own pace and convenience. The module was structured to promote active learning by encouraging students to engage directly with the reading materials. It utilized modern technology to deliver learning content in a more dynamic and interactive format than traditional textbooks or classroom lectures. The module was designed to be student-centered, allowing for self-directed learning and providing students with the opportunity to explore reading materials in a way that suits their learning styles. (Linda et al., 2020) The content of the module was structured in a way that encouraged reflection and problem-solving, which are essential skills in academic reading.

Ethical considerations were an integral part of this research process. All participants were informed about the purpose of the study and their rights as participants. They were given the option to voluntarily participate in the research, and their consent was obtained before any data were collected. Confidentiality and anonymity were ensured by assigning identification numbers to the participants and by securely storing all data. The results of the study were reported in aggregate form, ensuring that individual participants could not be identified from the data.

Data were collected using the pre-test and post-test assessments. Before the intervention, all participants took the pre-test, which measured their baseline reading skills. After the intervention, students completed the post-test, which was identical to the pre-test, to assess any changes in their reading abilities as a result of the digital module. In addition to the pre-test and post-test assessments, students were also asked to provide feedback on their experiences using the digital module through a questionnaire. This questionnaire collected qualitative data on students' perceptions of the module's effectiveness, ease of use, and overall satisfaction with the learning experience. The feedback helped to contextualize the quantitative findings and provided valuable insights into the students' engagement with the digital tool.

The data collected from the pre-test and post-test assessments were analyzed using descriptive statistics and inferential statistics. Descriptive statistics, such as the mean, standard deviation, and variance, were used to summarize the data and provide a general overview of the students' performance before and after the intervention (Green et al., 2023). To determine whether there was a statistically significant difference in reading skills between the pre-test and post-test results, ANOVA (Analysis of Variance) was employed. ANOVA is a powerful statistical technique used to compare the means of more than two groups or conditions (Sudrajad, 2023). In this case, ANOVA was used to compare the reading skills of students before and after using the digital module. The analysis indicated whether the intervention had a significant impact on students' reading skills.

Additionally, the normality of the data was tested using the Kolmogorov-Smirnov test, which helped to ensure that the data met the assumptions necessary for valid statistical analysis (Puritz et al., 2023). The results of the normality test showed that the data followed a normal distribution, which is an essential prerequisite for conducting ANOVA. Homogeneity of variance was also tested, and the results indicated that the variances in the pre-test and post-test groups were equal, further validating the use of ANOVA for the analysis. The collected data underwent analysis using ANOVA One Way, focusing on prerequisite testing before hypothesis testing. The steps included:

1. Grouping data to compare students' reading skills between those utilizing the English Digital Module (A1) and those without.
2. Performing prerequisite tests such as normality and homogeneity to confirm the suitability of the data for further analysis.

To ensure accuracy and efficiency, the entire analysis process was conducted using SPSS 20.0 for Windows. The research was structured to evaluate whether the intervention of digital modules significantly impacts students' reading skills. This method provided a robust framework for validating the effectiveness of the teaching intervention and its alignment with educational objectives. By employing this rigorous quantitative approach, the study aims to contribute valuable insights into the integration of digital learning tools in enhancing reading skills in higher education settings.

RESULTS AND DISCUSSION

The results of the study were analyzed based on the pre-test and post-test data, as well as the feedback collected from the participants regarding their experience with the digital module. The study aimed to assess the effect of using a digital English module on improving students' reading skills. In this section, the analysis and interpretation of the data will be presented in a detailed manner, covering both the descriptive and inferential statistics findings. The descriptive statistics for the pre-test and post-test scores were calculated to provide an overview of the students' reading skills before and after using the digital module. The mean, standard deviation, variance, maximum score, minimum score, and range for the post-test data were computed and are summarized in Table 2.

Table 2. The Statistics Result

Statistic	A1
Mean	79,77
Standard Deviation	6,86
Variants	64,99
Maximum Score	100,00
Minimum Score	67,70
Range	35,10

Table 2 shows the mean post-test score of 79.77 indicates a high level of reading proficiency among students after using the digital module. This outcome aligns with prior studies that highlight the role of technology in enhancing cognitive abilities, particularly in reading comprehension, vocabulary development, and critical thinking (Noroozi & Mulder, 2017). The standard deviation of 6.86 reflects some variability in student performance, which may stem from differences in prior knowledge, familiarity with technology, and individual learning styles. While some students may have faced challenges adapting to the digital environment or encountered technical issues, the overall range of scores (67.70–100.00) suggests that the module was effective for most students, leading to a significant improvement in their reading skills. The variance value of 64.99 further supports the presence of variability, while the score range of 35.10 indicates a broad distribution. Despite these variations, no student scored below 67.70, and many achieved scores in the high range, reflecting the module's positive impact on reading comprehension. Overall, the post-test results demonstrate that the majority of students benefited from the intervention, confirming the module's role in fostering English reading proficiency.

To ensure the validity of the statistical tests performed, the normality of the data was assessed using the Kolmogorov-Smirnov test (Puritz et al., 2023). This test was conducted to determine whether the distribution of the data for both the pre-test and post-test scores followed a normal distribution, which is a necessary assumption for conducting parametric tests such as ANOVA. The results of the Kolmogorov-Smirnov test for the post-test data showed a significance value greater than 0.05 ($p > 0.05$). This indicates that the distribution of post-test scores was approximately normal, meeting the assumption for conducting further analysis. In addition, the assumption of homogeneity of variance was tested. This assumption requires that the variances of the different groups (pre-test and post-test) be roughly equal. To test for homogeneity, the Levene's test was used. The result of Levene's test indicated a significance value of 0.514, which is greater than the critical value of 0.05. This suggests that the variances of the pre-test and post-test groups were homogeneous, further justifying the use of ANOVA to analyze the differences between the groups.

The primary inferential statistical test used in this study was the One-Way Analysis of Variance (ANOVA) to assess differences in students' reading skills between pre-test and post-test scores. The ANOVA results indicated a significance value of 0.002 ($p < 0.05$), confirming a statistically significant improvement in students' reading skills after using the digital module. This finding supports the rejection of the null hypothesis, affirming the positive impact of the intervention. Additionally, the calculated effect size revealed a moderate to large impact, demonstrating that the digital module effectively enhanced students' reading comprehension and engagement. This finding supports the hypothesis that the use of the digital module significantly improved students' reading skills. It also aligns with previous research which suggested that digital tools can enhance language learning by making it more interactive and engaging, leading to better student outcomes (Digout & Samra, 2023).

The results of the study indicate that the use of a digital module significantly improved students' reading skills in an English language course. The analysis of both the quantitative data (pre-test and post-test scores) and the qualitative feedback from students supports the effectiveness of the digital module as an innovative learning tool. The findings suggest that technology-based learning can be an engaging and effective method for improving language skills, particularly reading comprehension. These results align with previous studies that have shown positive effects of technology on language learning, including enhanced engagement and improved academic performance (Bedenlier et al., 2020; Saragih et al., 2024; Wei, 2022). The students' positive feedback and the statistical significance of the results demonstrate the potential of digital learning tools in enhancing students' academic abilities and preparing them for a future in a technology-driven world.

Digital modules offer several advantages for students and educators. First, technological exposure and adaptation: digital modules immerse students in modern learning environments, helping them enhance their reading skills while developing essential digital literacy for the demands of today's world (Dewi et al., 2022). Second, active engagement and participation: unlike traditional methods, digital modules transform students from passive recipients of information into active participants in their learning journey. By interacting with content, asking questions, and independently solving challenges, students become more engaged and self-directed (Kas-Osoka et al., 2018; Septianti et al., 2023). Third, problem-solving skills: the modules present students with tasks requiring critical thinking, such as analyzing reading comprehension problems and solving challenges using textual evidence. This encourages students to approach reading materials analytically, identify main ideas, deduce meanings, and develop logical solutions (Kusumawati et al., 2021). Fourth, critical thinking and analysis: by engaging students in activities that require them to analyze texts, formulate hypotheses, and synthesize information, the modules promote higher-order thinking, further improving both reading skills and analytical abilities. Finally, real-world application: the digital modules bridge the gap between academic learning and real-world challenges by allowing students to apply their knowledge in practical contexts, particularly within the technological framework of Society 5.0.

The findings of this study are consistent with similar research on the integration of technology in language learning. For instance, Tarigan et al. (2021) found that interactive digital resources, such as flipbooks, helped students in technical fields improve their learning outcomes by

providing an engaging and interactive platform for learning. In both studies, students reported that the use of digital tools made the learning process more dynamic, engaging, and interactive, compared to traditional methods. Similarly, this study demonstrated that the digital English module contributed to improved reading comprehension, engagement, and overall learning outcomes. Additionally, studies by Haldorai et al. (2021) and Bencheva & Kostadinov (2021) found that digital learning tools, particularly those that incorporate multimedia elements such as videos, quizzes, and interactive texts, are effective in enhancing critical thinking, comprehension, and student engagement. The digital module used in this study featured interactive reading exercises, quizzes, and multimedia content, which allowed students to actively engage with the material, thereby enhancing their ability to understand and analyze English texts. The positive results observed in this study are in line with these findings, demonstrating that the use of interactive digital content can significantly boost students' cognitive abilities in language learning.

The features of the digital English module are inherently aligned with the principles of constructivism and active learning. Constructivist learning theory emphasizes that learners construct knowledge actively through interactions with their environment (Piaget, 2003), and (Vygotsky, 1978). The module's interactive quizzes and real-time feedback exemplify this principle by providing opportunities for students to test their understanding, receive immediate corrections, and refine their knowledge iteratively (Figueroa-Cañas & Sancho-Vinuesa, 2021). These features encourage self-reflection and active engagement, which are core to experiential learning. Additionally, the module's multimedia content, including videos and images, supports multiple modes of learning, enabling students to explore and understand material from different perspectives (Liu & Elms, 2019). This dynamic approach aligns with the constructivist idea that knowledge is constructed through diverse experiences and active exploration.

Active learning, which focuses on student-centered approaches, is also well-supported by the module. For instance, the self-paced learning feature allows students to take responsibility for their progress, fostering autonomy and deeper engagement with the material. Furthermore, task-based exercises within the module promote critical thinking and problem-solving, as students analyze reading texts, formulate hypotheses, and draw conclusions based on textual evidence. These features collectively create an environment where students are not passive recipients of information but active participants in constructing their knowledge. This integration of constructivist and active learning principles makes the digital module a powerful tool for enhancing not only reading skills but also higher-order cognitive abilities. This approach aligns with the work of (Larsen–Freeman, 2019) who argued that active learning improves student performance by promoting engagement, collaboration, and critical thinking.

The students' positive feedback regarding the interactive and flexible nature of the module further supports the idea that constructivist and active learning principles were effectively applied. Many students noted that the ability to learn at their own pace and review content as needed was a significant advantage of the digital module. This flexibility allowed students to tailor their learning experience to their individual needs, improving their overall engagement and performance (Xavier & Meneses, 2021). The digital module introduced in this study fosters a more student-centered approach, where students are encouraged to actively engage with the content, explore different learning resources, and participate in discussions. The use of digital tools not only enhances cognitive engagement but also stimulates students' affective and psychomotor development by encouraging critical thinking, self-regulation, and independent learning (Baughman et al., 2023).

The results of this study have important implications for the broader educational landscape. As the world becomes increasingly digital, higher education institutions must adapt to new technologies and pedagogies (Grosseck et al., 2020). By incorporating technology into their teaching strategies, educators can foster a more dynamic and interactive learning environment that meets the needs of today's students (Digout & Samra, 2023). This shift towards technology-driven education also aligns with the broader goals of Society 5.0, where technology is integrated into every aspect of life, including education (Al Faqih et al., 2023). By preparing students with the necessary skills to navigate this digital landscape, educators are helping them succeed both academically and professionally.

The practical implications of this study are significant for language educators and curriculum developers. Educators should consider integrating more digital tools, such as interactive reading

materials, online quizzes, video tutorials, and discussion forums, into their teaching practices. These resources actively engage students with the content, improving their comprehension and critical thinking skills. Moreover, the integration of digital modules bridges the gap between traditional classroom instruction and the demands of a technology-driven world. By incorporating these tools, educators can equip students with the technological literacy and digital communication skills increasingly required in the modern workforce (Yooyativong, 2018). This approach also supports a shift toward student-centered learning, where students take an active role in their education. Student-centered methods are particularly effective in improving reading skills, as they foster autonomy, engagement, and a deeper understanding of materials. By adopting student-centered teaching strategies and leveraging digital tools, educators can create dynamic and inclusive learning environments that encourage students to take ownership of their learning. This paradigm shift not only enhances academic outcomes but also prepares students to thrive in a rapidly evolving, technology-driven world.

LIMITATIONS

While the results of this study are promising, several limitations should be addressed in future research. First, the study was conducted with a specific group of students at Cipta Wacana Christian University of Malang, and the findings may not be generalizable to other student populations. Future studies could replicate this research with different groups of students, including those from diverse educational backgrounds or institutions, to determine the broader applicability of the findings. Second, the study relied on a single digital module for the intervention. Future research could explore the effects of different types of digital tools, such as mobile applications, online learning platforms, or virtual classrooms, to compare their effectiveness in improving reading skills. Additionally, it would be valuable to investigate the long-term effects of digital module use on reading proficiency, as this study focused on short-term gains.

CONCLUSION

The findings of this study demonstrate the effectiveness of digital modules in improving students' reading skills in the digital English era. The high mean score (79.77) and low standard deviation (6.86) indicate consistent improvement, supported by the hypothesis test significance (0.002). These results affirm the positive impact of digital modules on reading skills, critical thinking, creativity, and independent learning—key competencies for success in a digital society. By providing personalized and interactive learning experiences, digital tools like the English Digital Module foster active learning and engagement while addressing diverse educational needs. This study underscores the importance of integrating digital innovations into education to enhance learning outcomes and align with the demands of modern society. Future research could explore the long-term effects of digital modules on language skills and investigate other digital tools, such as gamified platforms or AI-driven assistants, to broaden understanding of their potential in education. Finally, future studies could include a qualitative component that involves more in-depth interviews or focus groups with students to gather further insights into their experiences with digital learning tools. This would help to better understand the challenges and benefits of using digital modules from the students' perspectives and provide more nuanced recommendations for improving digital language instruction.

AUTHOR CONTRIBUTIONS

YS Conceptualization, data analysis, and manuscript writing, AS Research design, methodology, and supervision. RP Data collection, instrument validation, and statistical analysis. MHF Literature review, editing, and final approval of the manuscript. All authors contributed equally to the research and preparation of the manuscript and approved the final version for submission.

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