



THE IMPLEMENTATION OF DIGITAL-BASED READING COMPREHENSION TEST TO STUDENTS : A LIBRARY RESEARCH

PENERAPAN TES PEMAHAMAN BACAAN BERBASIS DIGITAL PADA SISWA : STUDI PUSTAKA

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Abstrak

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Penelitian ini menyelidiki penerapan tes pemahaman bacaan berbasis digital dalam lingkungan pendidikan, menyoroti efektivitasnya dan tantangan yang ditimbulkannya. Karena perangkat pembelajaran digital semakin diterapkan dalam kurikulum pendidikan, penelitian ini menyelidiki bagaimana teknologi dapat memperkaya evaluasi pemahaman bacaan. Dalam eksplorasi komprehensif literatur terkait, peneliti menganalisis kekuatan dan kelemahan yang terkait dengan penerapan tes pemahaman bacaan berbasis digital. Temuan utama kami menunjukkan bahwa tes digital memberikan banyak manfaat, termasuk umpan balik langsung, kemampuan beradaptasi, dan aksesibilitas yang ditingkatkan, yang semuanya secara signifikan meningkatkan keterlibatan siswa dan hasil belajar. Meskipun demikian, penelitian ini juga membahas beberapa tantangan, seperti kendala teknologi, kesenjangan dalam literasi digital, dan perlunya kerangka kerja tes yang terstruktur dengan baik. Penelitian ini berpuncak pada serangkaian rekomendasi mendalam yang ditujukan kepada para pendidik dan pembuat kebijakan, yang mengadvokasi integrasi tes digital untuk meningkatkan pengembangan keterampilan pemahaman bacaan di kalangan siswa.

Kata Kunci : berbasis digital, implementasi, pemahaman bacaan, tes

Abstract

This research delves into the implementation of digital-based reading comprehension test within educational environments, highlighting both its effectiveness and the challenges it presents. As digital learning tools become increasingly woven into educational curricula, this research investigates how technology can enrich the evaluation of reading comprehension. In a comprehensive exploration of pertinent literature, researchers analyzed the benefits and challenges associated with the implementation of digital-based reading comprehension test. Our key findings indicate that digital tests provide numerous benefits, including immediate feedback, adaptability, and enhanced accessibility, all of which significantly bolster students engagement and learning outcomes. Nonetheless, this research also addresses several challenges, such as technological constraints, gaps in digital literacy, and the necessity for well-structured test frameworks. This research culminates in a series of insightful recommendations aimed at educators and policymakers,



advocating for integration of digital tests to enhance the development of reading comprehension skills among students.

Keywords : digital-based, implementation, reading comprehension, test

INTRODUCTION

In an age characterized by swift technological progress, the educational landscape has undergone a remarkable evolution, especially in test techniques. Among the most noteworthy advancements is the introduction of digital-based reading comprehension tests, designed to elevate students' reading skills through engaging and technology-enhanced platforms. These digital test methods offer a plethora of benefits, including immediate feedback, adaptive testing tailored to individual needs, and enhanced accessibility, positioning them as a compelling alternative to conventional paper-based evaluations (Mangen & Kuiken, 2014).

Reading comprehension is an essential skill that significantly influences students' academic achievements. The incorporation of digital technology in reading tests has gained traction, owing to its proven effectiveness in evaluating students' cognitive capabilities and levels of engagement (Berzak et al., 2020). Studies indicate that digital-based reading tests can empower students to engage with texts in a more dynamic manner, thereby enhancing their overall comprehension abilities (Delgado et al., 2018). Additionally, digital platforms have the capacity to integrate multimedia components—such as hyperlinks, videos, and interactive questions—which can further elevate students' engagement and motivation (Day et al., 2024). Moreover, the embrace of digital platforms empowers students to engage in independent learning, enabling them to progress at their own pace and tap into a wealth of supplementary resources to bolster their understanding. This self-directed educational landscape has demonstrated remarkable efficacy, particularly for those who may find conventional classroom environments challenging.

One of the most compelling benefits of digital-based reading comprehension tests lies in their adaptability. In contrast to conventional evaluations, digital tests can be tailored to meet the unique needs of each student, thereby facilitating differentiated instruction and focused skill enhancement (Salmerón et al., 2013). For example, adaptive testing algorithms can modify the difficulty of questions in response to a student's answers, yielding a more precise test of their reading capabilities (Wang & Jiao, 2016). Furthermore, digital platforms provide immediate feedback, an invaluable resource for both students and educators in pinpointing areas that necessitate further development (Coiro, 2020). Furthermore, the capacity of digital tests to monitor student progress over time empowers educators to deliver precise interventions that cater to individual needs. The instantaneous analysis of test outcomes enables teachers to refine their instructional approaches and customize learning experiences, thereby cultivating a more effective and personalized learning for every student.

While the advantages of digital-based reading comprehension tests are abundant, their implementation is not without its challenges. A crucial factor influencing students' performance in these tests is their level of digital literacy. Barzilai & Zohar (2012) highlight that those with insufficient digital skills may find it difficult to effectively engage with online reading materials,



ultimately impeding their comprehension. Additionally, issues related to test security, technical difficulties, and equitable access to digital resources require careful consideration to promote fair test practices.

The shift from conventional to digital reading comprehension tests demands thoughtful planning and thorough evaluation. It is essential that educators receive comprehensive training to incorporate technology into their test approaches (Donnelly et al., 2011). Moreover, taking into account the perspectives and experiences of students with digital tests is vital for improving both their effectiveness and user-friendliness (Afflerbach & Cho, 2009). Furthermore, the dynamic landscape of digital platforms necessitates regular updates and enhancements to ensure their continued relevance and efficacy in evaluating students' competencies. A synergistic partnership among educators, students, and technologists is essential in cultivating an optimized testing environment that truly elevates learning outcomes.

In summary, the adoption of digital reading comprehension tests presents a compelling method for evaluating students' reading skills in a dynamic and efficient way. Although certain challenges persist, the advantages of digital tests—including tailored learning experiences and instant feedback—underscore the necessity for ongoing research and innovation in this field. As digital education advances, the incorporation of cutting-edge assessment strategies will be essential in transforming the landscape of reading comprehension instruction and evaluation. Hence, this research endeavors to examine the implementation of digital reading comprehension tests for students, emphasizing their influence on reading proficiency, student engagement, and overall academic performance.

RESEARCH METHOD

This research employs library research methodology as its primary means of data collection. This comprehensive review entails a thorough examination of a diverse array of pertinent sources, including books, academic journals, articles, research reports, and other relevant materials that pertain to the topic under investigation (Saragih, 2022). As noted by Adlini et al. (2022), a library research serves as a vital data collection technique that facilitates the understanding and exploration of theories drawn from various scholarly works. By adopting this approach, researchers aim to establish robust theoretical framework and achieve a profound comprehension of the issues.

Furthermore, the library research functions to trace the evolution of prior research, critically analyze existing findings, and pinpoint research gaps that may inform future inquiries. According to Darmalaksana (2020), the qualitative library research process encompasses several stages, including source identification, data classification, data processing, and data interpretation. Consequently, the library research is indispensable in constructing the theoretical and methodological framework.



FINDINGS AND DISCUSSION

The library research conducted on the implementation of digital-based reading comprehension tests has uncovered a wealth of insights regarding their efficacy in comparison to traditional print-based assessments.

1. Comparative Performance: Digital vs. Print

A comprehensive meta-analysis conducted by Delgado et al., (2018) revealed that individuals tend to achieve greater comprehension when engaging with text on paper rather than on digital devices. This finding underscores the profound impact that the medium of reading has on the processing and understanding of information. In a similar vein, (Shanahan, 2024) highlighted that digital reading leads to diminished comprehension levels, as readers often engage in a faster and more superficial approach to the material.

Nevertheless, in light of these findings, digital-based comprehension tests are gaining traction in classrooms across the globe, largely owing to their accessibility, cost-efficiency, and straightforward administration. Educational institutions are harnessing platforms like adaptive learning software, online standardized testing tools, and interactive e-books to facilitate these tests. A growing number of educators are incorporating screen-based evaluations into their curricula, aiming to equip students for a technology-centric future, even as concerns remain about the depth of comprehension and cognitive demands involved.

2. Influence of Digital Device Usage in Education

A research conducted by Salmerón et al. (2023), which examined data from more than 149,000 fourth-grade and 144,000 eighth-grade students, revealed a concerning trend: increased daily use of digital devices in language arts classes was linked to a decline in reading comprehension test scores, particularly among fourth graders. Yet, when educators thoughtfully incorporated digital tools into collaborative reading projects, a remarkable improvement in student comprehension was observed, underscoring the positive impact of well-structured digital integration on literacy development. In contrast, the use of digital tools solely for isolated skills, such as vocabulary enhancement, correlated with a decrease in reading comprehension.

A pivotal element in the successful implementation of digital-based comprehension tests lies in the art of teacher facilitation. Research by Leu et al. (2014) underscores that when educators impart essential digital literacy strategies—such as the effective use of annotation tools, summarization techniques, and fostering active engagement with digital texts—students demonstrate enhanced performance on these tests. Additionally, students' comprehension of digital texts significantly improves when they are equipped with strategies to minimize distractions, such as hyperlinks and multimedia elements that could divert their focus from the core material (Salmerón et al., 2023).

3. Innovations in Digital Reading Tests

The landscape of reading test has been enhanced by innovations in digital reading tests, which now leverage adaptive learning technologies, artificial intelligence (AI), and interactive



interfaces. These adaptive tests intelligently modify question difficulty in real-time based on a student's responses, delivering a tailored evaluation of reading proficiency. Meanwhile, AI-powered analytics offer educators valuable insights into reading patterns, allowing for the identification of specific areas that require improvement. Furthermore, the advent of speech recognition technology facilitates oral reading fluency tests, proving especially advantageous for early readers. As Eyal (2012) stated, "Teachers must develop digital test literacy to effectively integrate technology into the evaluation process, ensuring that students benefit from personalized and adaptive tests." Collectively, these advancements foster a more precise and responsive methodology for evaluating literacy.

In addition to tailored experiences, digital reading tests significantly enhance accessibility and engagement. Features like text-to-speech capabilities, customizable font sizes, and interactive multi-sensory components cater to a wide range of learners, including those with disabilities. The use of online platforms allows for immediate feedback, creating a more dynamic and responsive learning environment. As noted by Xu (2024), "Artificial intelligence in education enriches learning experiences by offering personalized pathways and instant feedback, enabling students to engage more effectively with reading tests." Moreover, incorporating gamified elements into digital tests has proven to boost student engagement, transforming reading evaluations into interactive and less daunting experiences. As digital literacy continues to advance, these innovations are essential in fostering more inclusive, effective, and engaging reading tests.

4. Automated Scoring Systems

The integration of automated scoring systems into digital reading comprehension tests has been implemented to enhance efficiency. Innovative techniques, such as in-context BERT fine-tuning, have emerged to evaluate open-ended student responses, striving to preserve scoring accuracy while minimizing the need for human intervention (Fernandez et al., 2022). Furthermore, Säuberli & Clematide (2024) investigated the automatic creation and test of reading comprehension test items, showcasing the transformative potential of AI-driven methodologies in the realm of education.

The integration of automated scoring systems, while promising, does pose significant implementation challenges, particularly in discerning the subtleties of student responses. Research suggests that AI-driven test tools often find it difficult to accurately interpret intricate written arguments and nuanced inference-based answers. As a result, numerous educational institutions have adopted hybrid evaluation models, where AI conducts initial grading, subsequently followed by a human review to ensure precision. Furthermore, ethical considerations surrounding potential biases in algorithmic grading have emerged, highlighting the need for ongoing research aimed at enhancing the equity of automated testing systems across diverse student demographics.



DISCUSSION

The findings illuminate significant insights into the shifting dynamics between digital and print reading, as well as the integration of digital tools within educational contexts. The increasing adoption of digital-based tests underscores a growing demand for accessibility and efficiency in contemporary classrooms. Although there are valid concerns regarding the potential for superficial engagement with digital texts, these tests are being embraced for their user-friendliness and compatibility with a technology-driven educational framework. The effects of digital device usage in the classroom present a complex picture. While excessive screen time can impede comprehension, as highlighted by Salmerón et al. (2023), the strategic use of digital tools—particularly in collaborative endeavors—can significantly improve learning outcomes.

The incorporation of digital technologies into educational practices has fundamentally transformed conventional test methods, particularly in reading comprehension tests. In recent years, the utilization of digital platforms to evaluate students' reading abilities has attracted considerable interest from educators, researchers, and policymakers alike. Digital-based comprehension tests present a myriad of advantages over traditional paper-based tests, including immediate feedback, personalization, and enhanced accessibility. These platforms foster a more vibrant and interactive learning environment, often integrating multimedia elements such as audio, visuals, and interactive questions, which significantly boost student engagement and comprehension. Furthermore, they facilitate the real-time collection and analysis of data, providing valuable insights into student performance that can inform and refine future instructional approaches.

A significant advantage of digital-based comprehension tests lies in their capacity to deliver immediate feedback to students. Unlike traditional evaluations, which may require days or even weeks for grading, digital platforms can assess responses in real time, enabling students to promptly recognize and rectify their mistakes. This swift feedback mechanism is invaluable, empowering learners to understand their strengths and pinpoint areas needing improvement. Moreover, it equips educators with insights into students' comprehension gaps, allowing them to tailor their teaching strategies effectively. Additionally, the integration of adaptive technology in certain digital tests personalizes the learning experience by adjusting question difficulty based on individual responses, ensuring that each student faces challenges that are perfectly suited to their skill level.

The adoption of digital-based comprehension tests is in perfect harmony with contemporary educational trends, particularly the growing emphasis on blended learning and digital literacy. By introducing students to digital tools and online evaluations, educators facilitate the development of vital 21st-century competencies, such as digital literacy, critical thinking, and problem-solving skills. Furthermore, digital platforms are often equipped with features designed to cater to a variety of learning styles and requirements. For instance, students with learning disabilities may find text-to-speech functionalities particularly beneficial, while others may appreciate the flexibility to progress at their own pace—an advantage that digital tests typically offer.

The successful integration of digital-based comprehension tests presents its own set of challenges. Foremost among these is the issue of technological accessibility. In numerous



educational environments, particularly those in low-income regions, students often struggle with unreliable internet connections or lack access to essential devices like computers or tablets. This digital divide can deepen existing disparities in education, hindering certain students from reaping the benefits of digital evaluations. Moreover, there is frequently insufficient training for both students and educators on how to adeptly navigate digital platforms, which may result in reluctance or suboptimal utilization of the technology. Additionally, some students may encounter difficulties related to the technical aspects of these platforms—such as navigation or unfamiliarity with digital reading tools—potentially impacting their overall performance.

Furthermore, while digital tests provide a diverse array of question types and formats, concerns linger regarding their validity and reliability in accurately gauging students' reading comprehension. Traditional tests, although not without their shortcomings, have undergone rigorous study and refinement over the years, ensuring a more precise measurement of reading skills. In contrast, digital platforms often depend on algorithms that lack transparency and may not be universally applicable, casting doubt on the fairness of their outcomes. Additionally, the comprehension skills necessary to respond effectively to digital questions may diverge from those demanded by conventional paper-based tests, as students may find themselves preoccupied with navigating the digital interface rather than fully engaging with the content of the reading passage.

The integration of digital-based comprehension tests presents a dual-edged opportunity for the educational landscape. On one hand, these digital tools can significantly enrich the learning experience by offering immediate feedback, fostering personalized learning pathways, and aligning seamlessly with modern educational practices. On the other hand, they raise important concerns regarding accessibility, the necessity for technological proficiency, and the imperative for thorough evaluation of their overall effectiveness. To maximize the positive impact of these digital tests on student learning outcomes, it is essential for educational institutions to invest in robust infrastructure, ensure comprehensive training for both students and educators, and engage in ongoing research to assess the efficacy and reliability of these tools. Ultimately, when implemented with care and inclusivity, digital-based comprehension tests hold the promise of enhancing the educational journey and nurturing critical literacy skills among students.

CONCLUSION

The adoption of digital-based comprehension tests brings forth a multitude of opportunities alongside certain challenges. While digital platforms can significantly boost engagement and tailor learning experiences, studies suggest that traditional print formats may still hold distinct advantages when it comes to deeper comprehension. It is essential for educators to strike a harmonious balance between integrating digital tools and adhering to pedagogical best practices to optimize student learning outcomes. Despite some limitations, the popularity of digital-based comprehension tests continues to grow in educational settings, thanks to their scalability, accessibility, and the provision of instant feedback. It is imperative for schools and policymakers to ensure that students are equipped with the necessary skills in digital-based strategies, while researchers and developers work to enhance AI-driven scoring systems to mitigate concerns



regarding fairness and precision. Ultimately, the effectiveness of digital comprehension tests will hinge on their capacity to cater to various learning styles and deliver valuable insights into student development.

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