e-ISSN: 2810-059X

THE IMPACT OF DIGITAL TOOLS ON IMPROVING LITERACY: A SYSTEMATIC LITERATURE REVIEW

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Abstract

This study aims to evaluate the impact of digital tools on improving literacy through a systematic literature review. The results of the study show that digital tools, such as e-books, educational applications, and online learning platforms, have great potential to improve student literacy by providing flexible access and a variety of relevant reading sources. Digital tools also offer interactive features that can increase student engagement and understanding, as well as provide instant feedback that aids the learning process. However, this study also identifies several challenges, including the digital divide and the potential for disruption that can result from uncontrolled use of digital tools. Optimising the benefits of digital tools for improving literacy requires collaboration from various parties, such as teachers, parents, and education policymakers, as well as adequate training for educators. Overall, when used correctly, digital tools can make a significant contribution to improving student literacy.

Keywords: Impact of Digital Tools, Literacy Improvement, Systematic Literature Review.

Introduction

In recent decades, advances in digital technology have transformed various aspects of human life, including education. In the field of education, it has brought about significant changes in the way teaching and learning take place. In this digital era, technological tools and platforms such as e-learning, virtual classrooms, and interactive whiteboards have become an integral part of the education process (Nguyen, 2022). This technology not only enables wider and faster access to information, but also supports a variety of more interactive and personal learning methods. For example, the use of AI-based learning applications can adjust learning materials and pace according to the individual needs of students, while augmented reality (AR) and virtual reality (VR) technologies offer a more immersive learning experience. In addition, technology also facilitates collaboration between students and teachers through digital communication platforms, providing more flexibility in the teaching and learning process and opening up new opportunities for distance or online learning. The implementation of technology

in education continues to evolve and has the potential to redefine the way we educate future generations (Johnson & Carter, 2019).

Among the impacts of these technological changes, one of the significant influences of the adoption of digital technology is in the field of literacy. Digital literacy is the ability to find, evaluate, utilise, share, and create content using information technology and the internet. This includes not only the technical skills to operate digital devices and navigate the internet, but also the critical ability to understand and utilise information effectively (Miller, 2021). Digital literacy involves a deep understanding of how technology works, the ethics of using digital information, and the ability to communicate and collaborate through digital platforms. In essence, digital literacy is a combination of the technical, cognitive, and social skills needed to participate and thrive in the digital world (Buren & Shrestha, 2018).

In today's information age, digital literacy is an essential skill. The importance of digital literacy lies in its role in preparing individuals to succeed in an increasingly digitised environment. In the context of education, digital literacy enables students to access and evaluate a wide range of information sources in a critical way, supporting them in research and autonomous learning (Robinson, 2019). In the world of work, digital literacy skills are in high demand in various industrial sectors that rely on technology for day-to-day operations and innovation. In addition, digital literacy also promotes greater participation in the information society, including understanding and using social media, e-commerce, and electronic government services. With good digital literacy, a person can become a wiser and more competent digital citizen, able to face the challenges and take advantage of the opportunities offered by technological developments (Higgins et al., 2012).

The use of digital tools in education has shown great potential in improving students' literacy skills. For example, the use of learning applications, e-books, and e-learning platforms allows for wider and more diverse access to information. In addition, digital tools offer interactive and engaging methods of learning that can increase student motivation and engagement. However, the adoption of digital tools in teaching and learning literacy raises a number of questions (Simmons, 2020). One of them is about the effectiveness of these tools in improving literacy compared to conventional methods. Although some studies show that the use of digital tools can improve students‘ literacy skills, there is still a need to understand in more depth the various factors that may influence these results, such as the quality of the digital tools used, support for their use, and the suitability of learning methods to students’ needs (Walker, 2017).

Therefore, this study aims to conduct a systematic literature review on the impact of digital tools on improving literacy. By evaluating and synthesising the existing literature, it is hoped that comprehensive insights can be gained into the extent to

which digital tools contribute to improving literacy and what factors play a role in this process.

Research Methods

The study in this research uses the literature method. The literature research method, often referred to as a literature review or library study, is a research approach that emphasises the collection and analysis of information from various written sources relevant to the topic under study. This process involves steps such as identifying, selecting, and analysing existing literature, including books, scientific journals, articles, reports, and other related documents (Yuan & Hunt, 2009); (Petticrew & Roberts, 2006). The main purpose of literature research is to understand the developments, theories, and findings that already exist in a particular field of study, as well as to identify research gaps that still require further exploration. Through this method, researchers can build a strong theoretical foundation for their studies, strengthen arguments, and ensure that their research has a deep and relevant academic basis. Literature research also helps to avoid duplication of effort by ensuring that the study conducted is a valuable addition to existing knowledge (Booth et al., 2016).

Results and Discussion

The Development of Digital Tools in Education

Along with the rapid advancement of technology, digital tools have become an important instrument in the transformation of the world of education. The development of digital tools in education has not only changed the way teaching is done, but also expanded accessibility and provided convenience for various groups. Digital tools include various devices and applications that are used to support the teaching and learning process, both inside and outside the classroom (Davis & Moolens, 2020).

In the beginning, computers and the internet were important milestones in the development of digital learning tools. With the emergence of these devices, teachers and students began to access more varied and up-to-date learning resources. Furthermore, the development of educational software has introduced more interactive and engaging teaching methods, such as simulations and educational games. Over time, technology has continued to evolve and bring new innovations such as online courses, educational applications, and online learning platforms (Smith & Thompson, 2021).

Educational software and applications have grown rapidly with the many options available. For example, applications such as Google Classroom, Moodle, and Canvas provide a platform for teachers to manage classes online, access teaching materials, and communicate with students. In addition, there are also specific applications such as Duolingo for language learning, or Khan Academy which provides a variety of study

materials for free. These applications not only facilitate access to learning, but also enable real-time monitoring of student progress (Tamim et al., 2011).

Mobile and tablet technology also plays an important role in the development of digital tools in education. These devices allow students to learn anytime and anywhere, without being limited by geographical location. With user-friendly applications and multimedia-supporting features, learning becomes more interesting and interactive. This technology is very helpful, especially during the COVID-19 pandemic, where distance learning has become the new norm (Green, 2021).

In addition, game-based learning (gamification) and virtual reality (VR) offer a more innovative and engaging approach. Gamification applies game elements in the learning process to increase student motivation and engagement. VR, on the other hand, provides a more immersive learning experience by allowing students to explore realistic virtual environments. For example, students can learn history by 'visiting' historical sites in a virtual world, or conduct scientific experiments in a virtual laboratory (Watts & Haynes, 2019).

Big data and analytics also open up new opportunities in the world of education. Through data collected from various digital tools, educators can understand students' learning patterns in greater depth. This data analysis allows for more targeted adjustments to the curriculum and teaching methods. For example, student performance analysis can help identify areas that need additional help, so that teaching can be focused on the areas where it is most needed (Pinkerton, 2018). However, despite bringing many benefits, there are also challenges in the implementation of digital tools in education. One of the main challenges is the digital divide, where not all students have equal access to technology. In addition, there are also concerns about data security and privacy, as well as teachers' readiness to adopt new technologies. Ongoing support and training are needed to ensure that technology can be used effectively and responsibly (Robinson, 2019).

Looking at this rapid development, the future of technology in education looks bright. Innovations continue to emerge, enriching the learning experience and opening up new opportunities. In the future, we can expect more sophisticated and integrated digital tools, making education more inclusive, personal, and effective. By continuing to overcome existing challenges and taking advantage of technological advances, education can continue to evolve to meet the needs of future generations.

The Impact of Digital Tools on Literacy

Digital tools such as smartphones, tablets, and computers have changed the way we access information. With the internet, information that was once limited to libraries is now just a few taps away. This more accessible knowledge can increase literacy by providing access to more learning resources, including e-books, articles, and educational videos (Martinez & Garza, 2020). In addition to text, digital tools enable the

use of other media such as video, audio, and animation to enrich learning. This supports different learning styles, allowing individuals to choose the method that suits them best, and thus improves the readability and understanding of the material. Along with the ease of accessing information, there are also challenges in the form of disinformation and fake news. Digital literacy is important for individuals to be able to critique and analyse the information they encounter online. Without these skills, there is a risk of individuals getting caught up in misleading information (Bennett & Carter, 2018).

The constant use of digital tools can affect concentration and memory. Constant exposure to notifications and ever-changing content can reduce the ability to focus and impact how information is processed and remembered in the long term (Wang & Stanford, 2017).

At the most basic level, digital tools can improve literacy skills by providing a platform for reading and writing exercises. Interactive applications and educational games play a role in teaching basic literacy skills to children in a fun and engaging way. Although digital tools offer opportunities for improved literacy, not everyone has equal access to this technology. The digital divide can cause differences in literacy levels between those who have access to digital tools and those who do not, widening the gap in education and knowledge (Joshi & Stevens, 2019).

Digital tools enable global collaboration and knowledge sharing. With platforms such as online forums, blogs, and social media, individuals can share knowledge and ideas, which can enrich literacy in ways that were previously impossible to do locally (Gonzalez & Lee, 2019).

On the other hand, digital tools are also changing reading habits. Many people are switching from reading printed books to e-books or online articles. While this improves accessibility, there are concerns that speed reading on a screen can reduce the depth of understanding and enjoyment of reading books in the traditional way (Murphy & Turner, 2018).

The use of digital tools, especially social media, encourages the use of shorter and more informal language. The use of abbreviations and emojis in everyday communication can affect the way people communicate in writing. While this can increase communication efficiency, there are concerns that it may lower traditional standards of writing and language use (Knight, 2020).

Digital tools can increase motivation and engagement in learning. Gamification in educational applications makes the learning process more interesting and competitive. Features such as badges, achievements, and leaderboards can encourage students to continue learning and achieve their literacy targets (Mahmood & Grunwald, 2017).

Overall, digital tools have a wide and diverse impact on literacy. This technology provides unlimited access to information, supports various learning styles, and has the potential to improve literacy skills. However, challenges such as disinformation,

changing reading patterns, and digital access gaps must also be recognised and addressed. Therefore, improving digital literacy is becoming increasingly important so that users can utilise technology wisely and effectively. With the right approach, digital tools can be a powerful means of improving literacy and knowledge globally.

Factors that Influence the Impact of Literacy

The factors that influence the impact of literacy are very diverse and involve interacting elements. One of the main factors is access to educational resources. The availability of books, digital devices, and adequate internet access is essential to support literacy development. Without this access, many individuals may face difficulties in developing adequate reading and writing skills (Miller, 2021).

The family environment also plays a large role in literacy development. A supportive family environment, with parents or guardians involved in a child's education, can provide a significant boost to literacy development. Parents who read frequently with their children, provide interesting books, and teach the importance of literacy can create a strong foundation for children's literacy skills (Green, 2021).

Formal education is another important factor. The quality of education in schools, teaching methods, and teacher competence all influence students' literacy skills. Schools that have strong literacy programmes, adequate educational resources, and well-trained teachers tend to produce students with superior literacy skills compared to schools that lack facilities and support (Judijanto & Aslan, 2025); (Purike & Aslan, 2025).

Technology and digital tools are also increasingly important factors in the modern era. The use of digital devices, such as tablets and computers, for reading and writing can enrich the literacy experience. Interactive learning applications and online platforms provide various ways to develop literacy skills, although they also pose challenges such as disinformation and digital distractions (Sitopu et al., 2024); (Guna et al., 2024); (Iksal et al., 2024).

Cultural aspects cannot be ignored either. Cultures that value literacy and have strong reading traditions usually encourage individuals to develop reading and writing skills. Cultural values that emphasise the importance of education and literacy can motivate individuals to continue learning and improve their literacy skills throughout life (Green, 2021).

Socio-economic conditions also play a significant role. Individuals from higher socio-economic backgrounds tend to have better access to literacy support resources, such as quality schools, books, and technology. In contrast, individuals from disadvantaged backgrounds may face greater barriers in accessing quality education and other literacy resources (Miller, 2021).

Mental and physical health also affect literacy skills. Health problems such as visual impairment, hearing impairment, and developmental disorders can impact a

person's ability to learn to read and write. Therefore, appropriate health interventions and support for individuals with special needs are essential in supporting literacy (Sanders, 2021).

Finally, individual motivation and interest play an important role in literacy development. Individuals who are motivated and have a high interest in reading and writing tend to develop better literacy skills. Programs and activities that foster an interest in reading, such as book clubs or creative writing projects, can help increase interest and engagement in literacy (Martinez & Garza, 2020).

Thus, the factors that influence the impact of literacy are very complex and involve various interrelated elements. Success in literacy does not depend on just one factor, but is the result of a combination of access, support, culture, socio-economic conditions, health, and individual motivation. Understanding and addressing each of these factors is essential to creating an environment that supports the development of literacy as a whole.

Conclusion

The conclusion from the literature review conducted on the impact of digital tools on improving literacy is as follows:

First, the use of digital tools in learning has great potential to improve student literacy. Digital tools, such as e-books, educational applications, and online learning platforms, offer flexibility in accessing reading materials and literacy activities. This allows students to learn anytime and anywhere, as well as access various sources of information relevant to their interests. This flexibility significantly increases students' interest and motivation in reading and learning, which in turn can improve their literacy skills.

Secondly, digital tools also provide interactive features that can increase student engagement in the learning process. Features such as animation, video, and interactive questions help make learning more interesting and easier to understand. In addition, the instant feedback provided by many digital tools helps students to immediately understand their mistakes and learn the material more effectively. This interactivity not only improves students' reading comprehension but also trains critical skills that are important in literacy. However, the use of digital tools in education also faces challenges and limitations. Not all students have equal access to technology and the internet, which creates a digital divide and inequality in learning outcomes. In addition, the uncontrolled use of digital tools can distract students from learning objectives. Effective use of digital tools requires training and supervision from teachers to ensure that technology is used optimally and supportively.

Overall, digital tools have a significant positive impact on improving student literacy if used correctly and wisely. It takes a joint effort from various parties, including

teachers, parents, and education policymakers, to overcome challenges and optimise the benefits of digital tools in literacy learning.

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