THE ROLE OF DIGITAL LEARNING TOOLS IN IMPROVING LITERACY SKILLS: A SYSTEMATIC REVIEW OF THE LITERATURE

Loso Judijanto *
IPOSS Jakarta, Indonesia
losojudijantobumn@gmail.com

Rusiadi
Institut Agama Islam Sultan Muhammad Syafiuddin Sambas

Abstract
This research examines the role of digital learning tools in improving literacy skills through a systematic review of the literature. The results show that digital technologies, such as interactive learning apps, e-books and multimedia platforms, have a significant positive impact on the development of literacy skills at different levels of education. These tools offer a more engaging and interactive learning experience, increasing students' interest and comprehension in reading. In addition, the use of digital tools allows for more personalised and adaptive learning to the needs of individual students. However, the successful implementation of digital technology relies heavily on supporting qualities such as equitable access to technology, adequate teacher training, and appropriate evaluation and approaches. This research emphasises the importance of collaborative efforts from educational institutions, teaching staff, parents and the surrounding environment in maximising the potential of digital learning tools to effectively improve literacy skills.
Keywords: Digital learning tools, literacy skills.

Introduction

In the increasingly advanced digital era, technology has become an integral part of everyday life, including in the field of education. The emergence of digital learning tools such as apps, e-learning platforms, and interactive software has opened up new opportunities to improve the quality of education. Digital learning tools are a wide range of software, applications, platforms and digital media specifically designed to support the education and teaching process (Sitopu et al., 2024); (Guna et al., 2024); (Fawait et al., 2024); (Syakhrani & Aslan, 2024). These tools include various formats, such as e-learning, interactive applications, educational games, simulations, and learning videos, which aim to enrich the learning experience and improve teaching effectiveness. Thanks to the ability to deliver dynamic and interactive content, digital learning tools allow students to learn in a more personalised, flexible and contextualised manner, while providing wider access and ease of access to educational resources. One important aspect of education that can benefit from the use of these technologies is literacy skills (Reddy et al., 2023).

Literacy skills, which include the ability to read, write and critically understand information, are an important foundation for academic success and civic life. Literacy is

not just the technical ability to read and write, but also includes the ability to understand, analyse and use information available in various formats (Peng & Yu, 2022).

Literacy skills play a crucial role in education as they form the basis for all teaching and learning processes. With good literacy, students are able to read, understand and analyse different types of texts, which enables them to absorb information more effectively. Literacy is not only limited to the ability to read and write, but also includes critical thinking skills and the ability to communicate ideas and knowledge. In the context of education, good literacy paves the way for students to explore various disciplines, understand the global context, and develop broader horizons (Park et al., 2021); (Judijanto et al., 2024); (Sartika & Fransiska, 2024).

Apart from the educational context, literacy skills are also very important in everyday life. Good literacy gives individuals the ability to participate fully in society, such as understanding news, interacting in a work environment, and making informed decisions. In the growing digital age, digital literacy is an important part that includes the ability to use technology wisely and understand information found online (Tinmaz et al., 2022). Therefore, literacy serves as the foundation that enables one to lead a productive, knowledgeable and well-informed life.

While many studies have highlighted the importance of literacy, challenges in improving literacy skills remain, especially in an era where information sources are increasingly diverse and complex. This is where the role of digital learning tools becomes crucial. With technology, the learning process can be made more engaging, interactive and customisable to each individual's needs. Digital learning tools also provide wider access to various learning resources, which in turn can increase student motivation and engagement in the learning process (Yasa & Rahayu, 2023).

However, despite the great potential of digital learning tools, many questions remain regarding their effectiveness and effect on literacy skills. Some studies show mixed results, with factors such as software design, educator engagement and infrastructure support being variables that influence learning outcomes (Zimmer & Matthews, 2022).

Therefore, this study examines the role of digital learning tools in improving literacy skills. By reviewing various literature sources, this research hopes to provide a clearer picture of the effectiveness of digital learning tools and identify the most effective types of tools.

Research Methods

The study in this research uses the literature method. Literature research method, also known as literature study, is an approach used to collect, analyse and interpret information that already exists in various written sources. This method involves an in-depth review of books, scientific journals, articles, research reports, and

other important documents relevant to a particular topic. (JUNAIDI, 2021); (Abdussamad, 2022).

Results and Discussion
Effect of Digital Learning Tools on Literacy Skills

Digital learning tools are software or hardware used to support the learning process through digital platforms. They include a wide range of technologies, such as educational apps, e-learning modules, webinars, online simulations, educational games, and interactive devices such as tablets and digital whiteboards (Udeogalanya, 2022). The main purpose of digital learning tools is to increase student engagement, interaction and understanding by utilising user-friendly and accessible technologies, as well as enabling more flexible and adaptive learning to various learning styles (Iksal et al., 2024); (Irwan et al., 2024).

Literacy skills are an individual's ability to read, write, understand and interpret written texts effectively and critically. These skills include not only a basic understanding of the text but also the ability to analyse information, solve problems and think critically about the content read. Good literacy enables people to communicate effectively, understand the wider social and cultural context, and participate actively and productively in society. In an increasingly connected and information-based world, literacy skills are essential for academic, professional and everyday success (Eynon, 2021).

Digital learning tools have brought significant changes in the way students develop literacy skills. Using educational apps, e-learning modules and various other digital platforms, students have greater access to diverse and interactive reading materials. For example, e-books and online articles are often equipped with features such as integrated dictionaries, hyperlinks for additional information, and multimedia that help clarify the concepts being discussed. This allows students to deepen their understanding of the text in more depth and variety, as well as making the learning process more interesting and engaging (Saleh et al., 2022).

In addition, digital learning tools often contain interactive elements that encourage students to actively participate in the learning process. For example, vocabulary-building apps and educational games can assist students in improving their reading and text organisation skills effectively through structured and fun exercises. Interactions with digital content are often designed to motivate students, which in turn leads to increased engagement and commitment to learning. This is crucial in building strong literacy skills, as active engagement is key in mastering reading and writing skills (Khan et al., 2022).

The use of digital learning tools also enables more personalised and adaptive learning, which is very useful in developing literacy skills. E-learning platforms are often equipped with algorithms that can adjust the difficulty of the material according to students' individual abilities. As such, students can learn at their own pace, receive instant feedback and focus on the areas where they need the most improvement. This ability to receive customised learning helps students develop their literacy more efficiently and effectively (Lukitasari et al., 2022).

However, while digital learning tools offer many benefits, there are also challenges that need to be addressed. One of the main issues is unequal access to technology, which can lead to a gap in literacy skill development between students who have access to devices and the internet and those who do not (Akhyar et al., 2021). Another challenge is digital distractions that can reduce student focus, as well as the need to train teachers in the effective use of technology in the learning process. Therefore, the integration of digital learning tools in literacy skills development requires a holistic and inclusive approach, which not only optimises technology but also considers broader social and pedagogical factors (Ratnaningsih et al., 2021).

In the face of these challenges, it is important for educational institutions and governments to take strategic steps to ensure that technology is accessible to all students. Providing digital devices, improving internet access in remote areas and training teachers to optimise digital learning tools are some initiatives that can help overcome these barriers. Investments in education technology infrastructure will not only narrow the digital divide, but also open up opportunities for literacy skills improvement equally across the student population (Marín & Castaneda, 2023).

In addition to institutional efforts, parental involvement also plays an important role in supporting their children to utilise digital learning tools wisely. Parents need to be involved in the process of introducing technology and are encouraged to supervise and accompany their children in the use of digital devices. This can help reduce the risk of digital distractions and ensure that screen time is used productively. Thus, synergies between schools, government and families will result in an environment conducive to the development of comprehensive literacy skills (Marín & Castaneda, 2023).

Overall, digital learning tools have great potential in improving students' literacy skills. They can make the learning process more dynamic, interactive and tailored to each individual's needs. However, this potential can only be maximised if there is comprehensive support in the form of adequate infrastructure, inclusive policies, appropriate training for teachers, and active involvement from parents (Suwarto et al., 2022).

Thus, digital learning tools have enriched methods and approaches in improving students' literacy skills. With easier access to interactive and contextualised resources, students can learn in a more engaging and personalised way. However, the successful implementation of these tools relies heavily on collective efforts to address the

challenges of access and inequity, as well as the need for adequate training for teaching personnel. Support from various parties, including educational institutions, governments and parents, is needed to ensure that technology can be optimally utilised so that literacy skills can develop effectively and equitably across all students.

Types of Digital Learning Tools and Their Effectiveness

Digital learning apps have become a practical and effective solution in developing students' skills in various fields. These apps are often designed with intuitive user interfaces and engaging interactive features (Giannikas, 2022). Examples include apps such as Duolingo for language learning, Khan Academy for maths and science, and Grammarly for improving writing skills. Students can access these apps on mobile devices or tablets, allowing them to learn anytime and anywhere. These digital learning apps are also often equipped with gamification, such as point systems and badges, which make learning more fun and motivating (Yu, 2022).

E-learning platforms are integrated solutions that combine different types of educational content and interactive tools to create a complete learning environment. Platforms such as Coursera, EdX and Udemy provide courses in various fields, from information technology to fine arts, taught by experts in the field. Features include video lectures, quizzes, discussion forums and downloadable materials. E-learning platforms also often offer globally recognised certifications, providing added value for students. With a more formal structure and often supporting instructor-led learning, e-learning platforms successfully bridge the gap between traditional and digital education (Zimmer & Matthews, 2022).

Interactive software, such as Smart Notebook or Kahoot!, allows teachers and students to participate in collaborative and dynamic learning. The software is often used in digital or blended learning classrooms, where they can manipulate objects, organise ideas in the form of concept maps, or participate in interactive quizzes. The interactive functionality of the software allows teachers to create learning that is contextualised and directly relevant to the material being taught. In addition, interactive software can also be used to structure more in-depth and formative evaluations, providing quick and useful feedback to students' learning process (Wijaya et al., 2021).

Each category of digital learning tools-apps, e-learning platforms and interactive software-offers uniqueness and benefits that can be used to enhance teaching and learning. Apps offer flexibility and personalisation; e-learning platforms provide comprehensive and structured educational content; while interactive software enables collaborative and dynamic learning (Morgan et al., 2022). Appropriate use of these three categories, in balanced combination, can create a holistic and effective learning environment, supporting students in various aspects of skills and knowledge acquisition. As such, digital learning tools continue to evolve to meet the needs of

modern education, enabling greater accessibility and effectiveness in the learning process (Alenezi, 2023).

Digital learning tools have been proven effective in increasing student engagement and motivation. One of the main reasons is the flexibility it offers; students can access materials at a time and place that suits their schedule, allowing for more individualised and needs-based learning. For example, language learning apps like Duolingo or e-learning platforms like Coursera allow students to learn at their own pace, repeating difficult material and skipping topics already mastered (Tikhonova et al., 2022). With unlimited access to a wide range of educational resources, digital learning tools provide opportunities for in-depth and personalised learning (Juliani & Aslan, 2024).

In addition, digital learning tools are able to provide a more interactive and engaging learning experience. Through the use of multimedia such as videos, animations and simulations, complex concepts can be explained in a way that is easier to understand. Interactive software such as Kahoot! allows teachers to create fun and competitive quizzes, thus increasing student engagement in the learning process. The gamification elements integrated in many learning apps also help to maintain student interest and motivation, making learning feel more like a game than an obligation (Dewi, 2022).

Finally, digital learning tools also support real-time analysis and tracking of student progress. Through e-learning platforms such as Google Classroom or Moodle, teachers can monitor learning outcomes and provide feedback quickly. The analytical data available allows teachers to identify areas where students may be struggling and adjust their learning strategies accordingly. In addition, formative evaluation features such as quizzes and assignments answered through the app or platform ensure that student understanding can be measured and improved continuously. Thus, digital learning tools not only increase engagement and motivation, but also aid in more effective and efficient learning.

Obstacles and Challenges of Digital Learning Tool Implementation

While digital learning tools offer many benefits, their implementation is not free from various obstacles and challenges. One of the main barriers is the availability and accessibility of technology. Not all educational institutions have enough budget to invest in the required hardware and software. This makes the digital divide even more pronounced, especially in rural areas or areas with poor internet infrastructure. The absence of adequate access can prevent students from fully utilising digital learning tools, thus reducing their effectiveness and benefits (Veronika et al., 2023).

The next challenge is digital skills among those who use and implement the technology. Teachers and faculty do not always have the necessary technical skills to operate and utilise digital learning tools effectively. Without adequate training, they

may have difficulty integrating these technologies into their curriculum. In addition, students also require guidance in optimally utilising these tools. This creates an additional need for ongoing training and technical support programmes (Weninger, 2023).

Another important obstacle is the issue of data security and privacy. As more students' personal data is stored on digital platforms, the risk of data security breaches also increases. Incidents such as data theft, hacking, and information leaks can have serious repercussions for students and educational institutions. Therefore, it is crucial for digital learning tool providers and educational institutions to implement strict security measures and comply with data protection regulations to protect sensitive information (Bayrakcı & Narmanlıoğlu, 2021).

Finally, resistance to change is also one of the challenges in the implementation of digital learning tools. Many educators and parents are still sceptical about the effectiveness of technology in education. There is a concern that reliance on technology may reduce the face-to-face interaction that is essential in the learning process. Overcoming this resistance requires a comprehensive approach and effective communication about the benefits and use of these technologies. Building a positive digital culture in the school environment can help reduce resistance and increase the adoption of digital learning tools more effectively (Isrokatun et al., 2022); (Mariska & Aslan, 2024).

Thus, the implementation of digital learning tools in education offers many benefits, but is also faced with various obstacles and challenges. The availability and accessibility of technology is a major barrier, especially in areas with inadequate infrastructure. Uneven digital skills among teachers and students also add to the complexity, while data security and privacy issues require special attention to avoid serious risks. In addition, resistance to change from various parties points to the need for effective communication approaches and the building of a positive digital culture. Addressing these obstacles thoroughly is key to realising the full potential of digital learning tools in education.

Conclusion

In a systematic review of the literature on the role of digital learning tools in improving literacy skills, it was found that the use of digital technologies has a significant positive impact on the development of literacy skills at different levels of education. Digital tools, such as interactive learning apps, e-books and multimedia platforms, offer a more engaging and interactive learning experience for students. This not only increases students' interest in reading but also enriches their vocabulary and reading comprehension. The use of digital tools allows for more personalised learning where materials can be tailored to each student's skill level and learning pace, thus providing an opportunity to improve literacy more effectively.

However, research also shows that the successful use of digital learning tools depends on the quality of implementation and support provided by educational institutions and teaching staff. Challenges such as disparities in access to technology, the need for adequate teacher training and appropriate evaluation approaches must be addressed to maximise the benefits of these technologies. In addition, the active involvement of parents and neighbours also contributes to building a strong literacy culture. Overall, while digital learning tools offer great potential in improving literacy skills, their long-term success requires collaborative efforts from all education stakeholders.

References

Abdussamad, Z. (2022). *Buku Metode Penelitian Kualitatif. Query date: 2024-05-25 20:59:55.* https://doi.org/10.31219/osf.io/juwxn

Akhyar, Y., Fitri, A., Zalisman, Z., Syarif, M., Niswah, N., & … (2021). Contribution of digital literacy to students' science learning outcomes in online learning. *International Journal of …, Query date: 2024-10-24 09:11:52.* https://www.academia.edu/download/83293919/19481.pdf

Alenezi, M. (2023). Digital learning and digital institution in higher education. *Education Sciences, Query date: 2024-10-24 09:11:52.* https://www.mdpi.com/2227-7102/13/1/88

Bayrakcı, S., & Narmanlıoğlu, H. (2021). Digital literacy as whole of digital competences: Scale development study. *Düşünce ve Toplum Sosyal Bilimler …, Query date: 2024-10-24 09:11:52.* https://dergipark.org.tr/en/pub/dusuncevetoplum/issue/63163/945319

Dewi, C. (2022). Digital literacy analysis of elementary school students through implementation of e-learning based learning management system. *Journal of Education Technology, Query date: 2024-10-24 09:11:52.*

Eynon, R. (2021). Becoming digitally literate: Reinstating an educational lens to digital skills policies for adults. *British Educational Research Journal, Query date: 2024-10-24 09:11:52.* https://doi.org/10.1002/berj.3686

Fawait, A., Siyeh, W. F., & Aslan, A. (2024). ISLAMIC EDUCATION MANAGEMENT STRATEGIES IN IMPROVING THE QUALITY OF LEARNING IN MADRASAS. *Indonesian Journal of Education (INJOE)*, 4(2), 657~665-657~665.

Giannikas, C. (2022). Developing Students' Digital Literacy Skills. *Structural Learning, Query date: 2024-10-24 09:11:52.* https://www.structural-learning.com/post/developing-students-digital-literacy

Guna, B. W. K., Yuwantiningrum, S. E., Firmansyah, S, M. D. A., & Aslan. (2024). Building Morality and Ethics Through Islamic Religious Education In Schools. *IJGIE (International Journal of Graduate of Islamic Education)*, 5(1), 14–24. https://doi.org/10.37567/ijgie.v5i1.2685

Iksal, I., Hayani, R. A., & Aslan, A. (2024). STRENGTHENING CHARACTER EDUCATION AS A RESPONSE TO THE CHALLENGES OF THE TIMES. *Indonesian Journal of Education (INJOE)*, 4(3), 761~774-761~774.

Irwan, I., Arnadi, A., & Aslan, A. (2024). DEVELOPING CRITICAL THINKING SKILLS OF PRIMARY SCHOOL STUDENTS THROUGH INDEPENDENT CURRICULUM LEARNING. *Indonesian Journal of Education (INJOE)*, *4*(3), 788~803-788~803.

Isrokatun, I., Pradita, A., Ummah, S., Amalia, D., & … (2022). Digital Literacy Competency of Primary School Teacher Education Department Student as the Demands of 21st Century Learning. *… School Forum (Mimbar …, Query date: 2024-10-24 09:11:52.* https://eric.ed.gov/?id=EJ1363738

Judijanto, L., Shodiqin, R., & Aslan. (2024). SOCIAL SOLIDARITY IN THE DIGITAL AGE: CHALLENGES AND OPPORTUNITIES. *Prosiding Seminar Nasional Indonesia*, *2*(3), 357–368.

Juliani, J., & Aslan, A. (2024). THE BASICS OF CURRICULUM DEVELOPMENT: CURRICULUM FROM THE ASPECTS OF IMTAQ AND IPTEK. *International Journal Of Humanities, Social Sciences And Business (INJOSS)*, *3*(2), 299–309.

JUNAIDI, J. (2021). *ANOTASI METODELOGI PENELITIAN KUALITATIF JOHN W. CRESWELL. Query date: 2024-05-25 20:59:55.* https://doi.org/10.31237/osf.io/6kt5q

Khan, N., Sarwar, A., Chen, T., & Khan, S. (2022). Connecting digital literacy in higher education to the 21st century workforce. *Knowledge Management &E-Learning, Query date: 2024-10-24 09:11:52.* https://eric.ed.gov/?id=EJ1348223

Lukitasari, M., Murtafiah, W., Ramdiah, S., Hasan, R., & … (2022). Constructing Digital Literacy Instrument and Its Effect on College Students' Learning Outcomes. *International Journal of …, Query date: 2024-10-24 09:11:52.* https://eric.ed.gov/?id=EJ1341565

Marín, V., & Castaneda, L. (2023). Developing digital literacy for teaching and learning. *Handbook of Open, Distance and Digital Education, Query date: 2024-10-24 09:11:52.* https://doi.org/10.1007/978-981-19-2080-6_64

Mariska, T., & Aslan, A. (2024). TECHNOLOGY-BASED CURRICULUM MODEL. *International Journal Of Humanities, Social Sciences And Business (INJOSS)*, *3*(2), 322–332.

Morgan, A., Sibson, R., & Jackson, D. (2022). Digital demand and digital deficit: Conceptualising digital literacy and gauging proficiency among higher education students. *Journal of Higher Education …, Query date: 2024-10-24 09:11:52.* https://doi.org/10.1080/1360080X.2022.2030275

Park, H., Kim, H., & Park, H. (2021). A scientometric study of digital literacy, ICT literacy, information literacy, and media literacy. *Journal of Data and Information Science, Query date: 2024-10-24 09:11:52.* https://doi.org/10.2478/jdis-2021-0001

Peng, D., & Yu, Z. (2022). A literature review of digital literacy over two decades. *Education Research International, Query date: 2024-10-24 09:11:52.* https://doi.org/10.1155/2022/2533413

Ratnaningsih, N., Ni'Mah, K., & … (2021). COVID-19 the earliest for digital learning in mathematics: An overview from technology literacy. *Journal of Physics …, Query date: 2024-10-24 09:11:52.* https://doi.org/10.1088/1742-6596/1819/1/012027

Reddy, P., Chaudhary, K., & Hussein, S. (2023). A digital literacy model to narrow the digital literacy skills gap. *Heliyon, Query date: 2024-10-24 09:11:52.* https://www.cell.com/heliyon/fulltext/S2405-8440(23)02085-6

Saleh, M., Komalasari, K., Sapriya, S., & … (2022). Building Digital Citizenship Literacy Skills Through 21st Century Skill-Based Civics Learning with Information Media and Technology Skills. *Annual Civic Education …*, *Query date: 2024-10-24 09:11:52.* https://www.atlantis-press.com/proceedings/acec-21/125969054

Sartika, E., & Fransiska, F. W. (2024). UNDERSTANDING THE STUDENTS'ENGLISH LEARNING ACHIEVEMENT AND HOME ENVIRONMENT SUPPORTS DURING SCHOOL CLOSURE TO RESPOND TO PANDEMIC AT PRIVATE MADRASAH TSANAWIYAH AT-TAKWA SAMBAS. *International Journal of Teaching and Learning*, 2(4), 939–953.

Sitopu, J. W., Khairani, M., Roza, M., Judijanto, L., & Aslan, A. (2024). THE IMPORTANCE OF INTEGRATING MATHEMATICAL LITERACY IN THE PRIMARY EDUCATION CURRICULUM: A LITERATURE REVIEW. *International Journal of Teaching and Learning*, 2(1), 121–134.

Suwarto, D., Setiawan, B., & … (2022). Developing digital literacy practices in Yogyakarta elementary schools. *… Journal of E-Learning*, *Query date: 2024-10-24 09:11:52.* https://academic-publishing.org/index.php/ejel/article/view/2602

Syakhrani, A. W., & Aslan, A. (2024). THE IMPACT OF INFORMAL FAMILY EDUCATION ON CHILDREN'S SOCIAL AND EMOTIONAL SKILLS. *Indonesian Journal of Education (INJOE)*, 4(2), 619~631-619~631.

Tikhonova, E., Kosycheva, M., & Efremova, G. (2022). Digital learning environment: Digital literacy, e-exclusion and cyber-wellness. *Proceedings of the 6th …*, *Query date: 2024-10-24 09:11:52.* https://doi.org/10.1145/3551708.3551716

Tinmaz, H., Lee, Y., Fanea-Ivanovici, M., & … (2022). A systematic review on digital literacy. *Smart Learning …*, *Query date: 2024-10-24 09:11:52.* https://doi.org/10.1186/s40561-022-00204-y

Udeogalanya, V. (2022). Aligning digital literacy and student academic success: Lessons learned from COVID-19 pandemic. *International Journal of Higher Education Management*, *Query date: 2024-10-24 09:11:52.* https://www.ijhem.com/cdn/article_file/2022-02-28-21-34-18-PM.pdf

Veronika, R., Camelia, C., & … (2023). Digital Literacy As A Social Mobilization And Learning Platform. *SEIKAT: Jurnal Ilmu …*, *Query date: 2024-10-24 09:11:52.* https://ejournal.45mataram.ac.id/index.php/seikat/article/view/544

Weninger, C. (2023). Digital literacy as ideological practice. *ELT Journal*, *Query date: 2024-10-24 09:11:52.* https://academic.oup.com/eltj/article-abstract/77/2/197/7080012

Wijaya, R., Mustaji, M., & … (2021). Development of mobile learning in learning media to improve digital literacy and student learning outcomes in physics subjects: Systematic literature review. *… Research and Critics …*, *Query date: 2024-10-24 09:11:52.* https://pdfs.semanticscholar.org/1ca7/1c656e4c2d6e5efc7fc4c87e6ff70114d7c2.pdf

Yasa, A., & Rahayu, S. (2023). A survey of elementary school students' digital literacy skills in science learning. *AIP Conference Proceedings*, *Query date: 2024-10-24 09:11:52.* https://pubs.aip.org/aip/acp/article-abstract/2569/1/060015/2870211

Yu, Z. (2022). Sustaining student roles, digital literacy, learning achievements, and motivation in online learning environments during the COVID-19 pandemic.

Sustainability, Query date: 2024-10-24 09:11:52. https://www.mdpi.com/2071-1050/14/8/4388

Zimmer, W., & Matthews, S. (2022). A virtual coaching model of professional development to increase teachers' digital learning competencies. *Teaching and Teacher Education, Query date: 2024-10-24 09:11:52.* https://www.sciencedirect.com/science/article/pii/S0742051X21002699