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The urgency of digital literacy learning in educational units: Systematic literature review

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Abstract

In this millennial era, it is very important to use digital literacy in education, especially learning for early childhood. The problem of education in the current digital era is that students do not have equal access to reading materials and their interest in reading is low. Thus, the aim of this research is to study the importance, causes, efforts and challenges associated with implementing digital literacy learning in educational units. The methods used are Systematic Literature Review (SLR) and bibliometric analysis. The data source uses article search criteria from 2021 to 2024 with the Publish or Perish application, based on SCOPUS sources with the title words being digital literacy learning. Data collection used the PRISMA procedure, 200 articles were obtained from the database and then in the screening process, 14 articles were included. Research results show that digital literacy in education does not only include teaching technology skills but also prepares future generations to think critically, communicate well, collaborate and be creative in the era of digital globalization. Implementing digital literacy learning, especially for early childhood, can develop more efficient learning models and media to face current technological challenges by using applications that are also integrated with local wisdom and prepare students for a future that is increasingly connected to technology. Further research focuses on creating more efficient learning models to prepare future generations to face the challenges of the technological era.

INTRODUCTION

The problem of education in the current digital era is that students do not have equal access to reading materials and their interest in reading is low. Educators almost never use digital literacy in the learning process. So, children use more real media in their learning compared to digital-based learning(Nurhaeti and Romadona, 2024). The most outstanding challenges to developing digital intelligence for teaching and learning include shared conceptions of digital intelligence, which are diverse and situated, the digital divide and the actual consideration of digital skills as a social practice (Davidson-Shivers and Rand, 2022).

The reason is due to lack of facilities and minimal teacher training in using digital literacy. At the same time, the lack of time for teachers to explore the possibilities of technology is also a barrier, especially as work demands increase (Wulandari et al., 2024). Teacher motivation is still low due to the fact that the adaptation process is quite difficult so that quite a lot of teachers do not complete digital use training (Winarti et al., 2022). This situation will certainly have an impact on children's digital skills competency so that the teacher's role is to determine students' mastery of digital literacy skills (Arsyad and Villia, 2022).

Efforts to overcome problems amidst rapid advances in digital technology, skills in logical thinking skills and digital literacy are key to adapting to social change, with the ability to learn on your own becoming the basis for updating knowledge and gathering skills to ensure success (Imjai et al., 2024). Digital literacy is seen as a valuable capability for student learning to assist in the acquisition of knowledge, skills and practices to enhance the learning experience (Ngcobo, 2022). By increasing digital literacy, the gap between those with access and those without technology skills will decrease. It is important to ensure that all students have an equal opportunity to receive a quality education.

Previous research also shows that the use of digital literacy is very important to overcome children's future problems. The digital literacy competency of PAUD educators must be improved so they can better utilize digital devices in learning to optimize the growth and development of early childhood (Novitasari and Fauziddin, 2022). Digital literacy focuses on developing students' problem-solving abilities and creativity by using technology as a tool (Widiyantti et al., 2024). The role of digital literacy can form a more critical individual mindset, can increase creativity and increase broad knowledge so that it can influence the quality of a person (Stevani and Nugraheni, 2024). With this literacy, there is a strengthening of character education in independence, commitment, honesty, and also responsibility in students doing various things, especially in carrying out digital literacy (Anjarwati et al., 2022).The difference from previous research is that this literature review focuses on collecting and synthesizing existing research to provide a general overview and find trends and differences in knowledge. Thus, this literature review and previous research complement each other, providing new data that can be reviewed and synthesized in literature research to gain a broader understanding of digital literacy learning in education.

In today's rapidly evolving educational field, digital learning has emerged as a transformative force, revolutionizing how students and educators interact with knowledge (Wei, 2023). Digital skills development is believed to be achieved through individual learning and improvement (Tian and Park, 2022). One of the skills for using technology in educational activities includes digital literacy which is related to the competencies and skills needed to use the internet, ICT and media (Rizal et al., 2021). Successful development of digital literacy skills can help students and educators adapt and thrive in an increasingly digital world.

The digital era has had positive and negative impacts on the development of early childhood character values (Fitrianingtyas and Jumiatmoko, 2023). Apart from that, technological developments can also bring changes to the way of thinking, behaving and behaving because every experience gained in every era or era will determine how the human brain functions and behaves (Hidayat et al., 2021). Digital literacy means more than just having the technical skills to operate digital devices well (Lukitasari et al., 2022).Digital literacy learning offers many benefits, including digital skills development, broad access and flexibility in learning. However, problems such as technology dependency, privacy issues, and the digital divide must be addressed with appropriate learning models, so that the negative impacts of digital literacy can be reduced and the benefits can be maximized.

This encourages researchers to review literature about the importance of digital literacy learning in educational units. It is hoped that the findings of this literature review will provide researchers with a strong basis for studying digital literacy learning in education. Therefore, the aim of this research is to study the importance, causes, efforts and challenges associated with implementing digital literacy learning in educational units. Thus, creating quality learning that is integrated with

digital technology in the world of education.The benefits of this literature review regarding digital literacy learning provide a strong basis for understanding, developing, and implementing digital literacy that is better, relevant, and has a positive impact on education, especially for early childhood. This allows educators to make better choices and design better programs to improve students' digital skills.

METHOD
Research Methods

The method used is Systematic Literature Review (SLR). In Indonesian, a systematic literature review is a literature review method that identifies, examines, evaluates and interprets all available research (Asani, 2023).

Data Collection

In the data collection stage, using the PRISMA (Prefereed Reporting Items For Systematic Reviews and Meta Analyses) procedure which includes identification, screening, egibility, and inclusion for data transparency from collection to filtering so as to obtain results and conclusions (Alakrash and Abdul Razak, 2021)
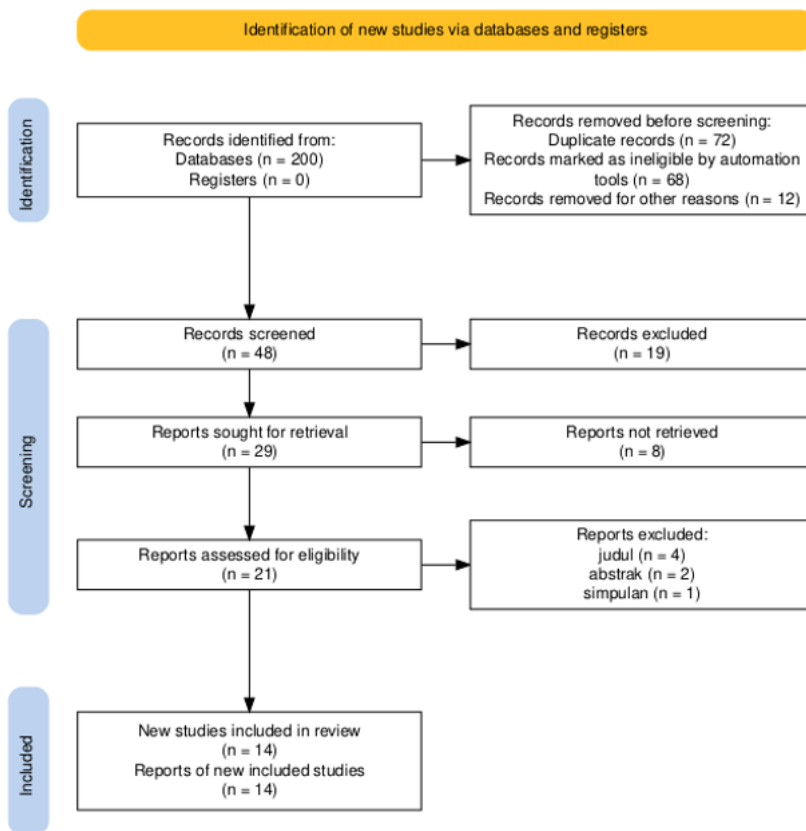

Figure 1. Prism Diagram

Data Analysis

Bibliometric analysisand Systematic Literature Review (SLR) were used in this research. Meanwhile, the purpose of using bibliometric analysis is to compare current research with future research plans (Darmayanti and Amalia, 2024). With this research stage, Planning, Conducting, Reporting.

Planning, a thorough literature review preparation process is required in this step. At this time, researchers have identified research subjects, especially digital literacy learning in educational units. Next, use the search criteria for articles from 2021 to 2024 based on Scopus sources, with the title words being digital literacy learning.

Conducting, this step begins by searching for items according to the requirements set at the planning stage. To find articles, use the Publish or Perish app. Articles must be appropriate to the research subject. Currently, at least 200 SCOPUS articles meet the title words requirements, namely digital literacy learning. Thus, the remaining 14 articles were selected based on available criteria for population inclusion and exclusion. Criteria for journal publications in the last three years that are relevant to digital literacy learning in educational units are used in this research. On the other hand, irrelevant titles, irrelevant abstracts, research conclusions that are not in accordance with the objectives of this research. After the selection process is complete, the next step is that the data collected will be presented in narrative form.

Reporting, systematic writing of the results of a literature review is the final stage of a systematic literature review. This is done in a prescribed written format.

RESULT AND DISCUSSION
Results

In the current era, where almost every aspect of life is influenced by technology. Digital literacy is becoming increasingly important in navigating the digital era, so it is very important to assess the suitability of the educational curriculum with the demands of digital literacy (Meyanti and Lasmawan, 2023). It's not just about teaching technology, but also about preparing future generations to live in an increasingly technology-based society. It is critical to ensure that every student has the skills they need to face the difficulties and opportunities of this digital age.

From the results of the analysis, 14 articles from SCOPUS discusseddigital literacy learningin educational units from kindergarten to senior secondary education. Table 1 below shows the results of this article's analysis.

Table 1. Urgency Digital Literacy Learning In Education Units

Name	Tittle	Results
(Yu, 2022)	Sustaining student roles, digital literacy, learning achievements, and motivation in online learning environments during the COVID-19 pandemic	Digital technologies and social regulations can improve online learning achievements. Teaching strategies, teacher–student cooperation, gamification, and computer applications can improve online learning achievements.
(Alakrash & Razak, 2021)	Technology-based language learning: Investigation of digital technology and digital literacy	The findings show that students' use of digital technology was the highest in learning vocabularies and lowest in reading skills, while teachers' highest use was for general teaching practices and lowest for reading skills.

(Dewi et al., 2021)	The urgency of digital literacy for generation Z students in chemistry learning	Digital literacy is needed in chemistry learning by focusing on the needs of Generation Z students in accessing the internet as a medium to promise easy community connectivity.
(Rizal et al., 2021)	Development of a problem-based learning management system-supported smartphone (PBLMS3) application using the ADDIE model to improve digital literacy	Based on its results, the t-value was -0.4752, with a p-value of 0.00 < 0.05. This means that the PBLMS3 application is effective for and capable of improving students' digital literacy.
(Alsowat, 2022)	Hybrid learning or virtual learning? Effects on students' essay writing and digital literacy	The hybrid learning model positively improved the students' digital literacy skills compared to the virtual learning model.
(Yustina et al., 2022)	The effect of problem-based learning through blended learning on digital literacy of eleventh-grade students on excretory system material	Problem-based learning model through blended learning positively affects the digital literacy of eleventh-grade students of SMA Negeri Plus Riau on the excretory system material.
(Forsling, 2023)	Collegial learning and digital literacy education in a Swedish preschool	The results show how five dedicated teachers, without a special interest in digital tools, started using tablets in preschool as a learning tool to achieve the goals in the curriculum regarding communication.
(Student et al., 2022)	Digital learning integrated with local wisdom to improve students' physics problem-solving skills and digital literacy	The results show that digital learning integrated with local wisdom is designed to improve students' physics problem-solving skills and digital literacy.
(Muharam et al., 2021)	The effect of using digital variety media on distance learning on increasing digital literacy	Media that is incompatible with the abilities of low grade children can be avoided by teachers in the distance learning process because low grade children need the introduction of digital literacy skills that are in accordance with the child's cognitive thinking stages.
(Triawang & Kurniawan, 2021)	The effect of digital literacy towards the selection of social science teacher learning media	The results revealed that there was a significant effect between digital literacy on the selection of social science teacher learning media.
(Niniana et al., 2024)	Introducing eco-literacy to early childhood students through digital learning	In addition to digital activities, efforts to improve ecological literacy should be extended through programs and exchanges regarding the need for environmental protection the 5R (refuse, reduce, reuse, recycle, and rot) approach. Further studies in the same topic on teaching eco-literacy to elementary school students can be carried out in a more intensive way through relevant games to instill a love of the environment based on 5R strategies.

(Khotimah et al., 2024)	Development of Virtual Field Trip-Based Learning Model as A Strengthening of Madrasah Student Digital Literacy	The model met the Effective criteria shown by the average results of strengthening digital literacy with an excellent category, and the average results of positive responses to the implementation of learning with Agree/Happy criteria, as well as the achievement of student learning outcomes from the three trial classes obtained a percentage increase above 5%.
(Anggraeni et al., 2023)	Student Digital Literacy Analysis in Physics Learning Through Implementation of Digital-Based Learning Media	The research findings indicate that students display good digital literacy skills in terms of operational abilities, excellent critical understanding skills, and satisfactory communication skills through media. Therefore, Physics Education students at Jember University possess good digital literacy when using digital-based learning media.
(Saripudin et al., 2023)	The Development of Podcast Based Learning Media on Social Studies to Improve Students' Digital Literacy	The results from these studies showed that using digital-based learning media, namely podcasts in social studies subjects, had a good impact and a significant effect on students' digital literacy skills.

Discussion

In education, digital literacy is very important to prepare students to face an increasingly connected and digital world. Digital literacy not only teaches students how to use technology, but also teaches them ethics, how technology impacts society, and how to think critically in a digital environment. In table 1 of the results of digital literacy analysis according to (Anggraeni et al., 2023)students demonstrate good digital literacy skills in terms of operational abilities, excellent critical understanding skills, and satisfactory communication skills through media. This proves that digital literacy supports the 4C skills: Critical Thinking, Communication, Collaboration and Creativity. By integrating digital literacy into 4C skills development, education can become more relevant to the demands of the 21st century.

With digital literacy, students can not only use technology, but also understand how technology affects society. Digital literacy is an important foundation for successful distance and online learning. This statement is in line with table 1 of the research results (Yu, 2022)states that digital technology and social regulations can improve online learning achievement. The hybrid learning model improves students' digital literacy skills positively compared to the virtual learning model (Alsowat, 2022). This ensures that students and teachers can utilize technology to achieve learning goals, solve problems, and stay connected even in physically separated learning environments. With good digital literacy, students and teachers can utilize technology to achieve learning goals. Use of digital literacy in applications, such as: Google Classroom, Moodle, Learning Management Systems (LMS), E-books, Zoom, Microsoft Teams, Google Meet, WhatsApp, etc. Based on table 1The PBLMS3 application is effective and able to increase students' digital literacy (Rizal et al., 2021). By using these applications in education, students have a better opportunity to learn and be prepared for the challenges of the digital era.

With good digital literacy, teachers and students can utilize technology to make education effective, effective and enjoyable. Digital literacy provides various learning media, resources and methods that can improve the quality and effectiveness of the learning process. Like the results of table 1 based on research (Dewi et al., 2021)Digital literacy is needed in chemistry learning by

focusing on the needs of Generation Z students in accessing the internet as a medium to promise easy community connectivity. Likewise, five dedicated teachers, with no particular interest in digital tools, started using tablets in the preschool years as learning tools to achieve curriculum goals on communication according to(Forsling, 2023). Media that is not compatible with the abilities of lower class children can be avoided by teachers in the distance learning process because lower class children need the introduction of digital literacy skills that are appropriate to the child's cognitive thinking stage (Muharam et al., 2021). There is a significant effect between digital literacy on the choice of learning media for social science teachers (Triawang and Kurniawan, 2021). The use of digital-based learning media, namely podcasts in social studies subjects, has a good impact and significant effect on students' digital skills (Saripudin et al., 2023). Between digital literacy and learning media there is a close and mutually supportive relationship. Digital literacy influences the way teachers and students use learning media, while appropriate learning media can increase students' digital literacy. This contributes to the formation of a learning environment that is more interactive, inclusive and in line with today's demands and challenges.

Plus, the use of varied methods using digital literacy can change the way teachers teach and the way students learn can increase the effectiveness, engagement and relevance of education. Based on table 1 research results (Yustina et al., 2022)The problem-based learning model through blended learning positively influences the digital literacy of eleventh grade students at SMA Negeri Plus Riau on excretory system material. Meanwhile, the model meets the effective criteria as shown by the average results of strengthening digital skills in the very good category, and the average results of positive responses to the implementation of learning with the Agree / Happy criteria, as well as the achievement of student learning outcomes from the three test classes which obtained a percentage increase above 5% of research results (Khotimah et al., 2024). With digital literacy, these various learning methods can create a learning environment that is more dynamic, interactive and responsive to student needs. With digital literacy, teachers and students can use technology to support better teaching and build skills that are important for students' futures.

By utilizing digital literacy, both traditional and distance learning can complement each other and provide education that is flexible, friendly and efficient in overcoming existing challenges. Based on table 1 research results (Alakrash and Abdul Razak, 2021) entitled "technology-based language learning: an investigation of digital technology and digital literacy". Digital literacy learning can also be integrated with local wisdom in the current era of globalization, because the combination of the two can be a powerful tool to encourage sustainable progress and strengthen the cultural identity of local communities. Digital learning integrated with local wisdom is designed to improve students' physics problem solving skills and digital skills as carried out by (Student et al., 2022). Introducing eco-literacy to elementary school students can be achieved by telling stories, watching videos, or organizing field trips (Niniana et al., 2024).

CONCLUSION AND RECOMMENDATION

Digital literacy in education not only includes teaching technology skills but also preparing future generations to think critically, communicate well, collaborate and be creative in the era of digital globalization. Implementing digital literacy learning, especially for early childhood, can develop more efficient learning models and media to face current technological challenges by using applications that are also integrated with local wisdom and prepare students for a future that is increasingly connected to technology. So digital literacy is very important to use from kindergarten to high school and even college/university. Further research focuses on creating more efficient learning models to prepare future generations to face the challenges of the technological era.

AUTHOR CONTRIBUTION STATEMENT

DECLARATION

The study's authors disavow any affiliations or involvement with organizations or entities that have a financial interest in the subject matter or materials discussed in this manuscript, as well as non-financial interests, such as personal or professional relationships, affiliations, knowledge, or beliefs, membership, employment, consultancies, stock ownership, or other equity interest.

DATA AVAILABILITY

The author analyzes the data setSystematic Literature Review(SLR)correctly and logically according to the stages listed.

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