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Research Article

Digital Learning Tools in Early Childhood Education: A Systematic Literature Review

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Abstract:

Background: The quick growth of digital technology has greatly changed how education is taught, especially in early childhood education. Many digital learning tools have been created to help young kids learn better, but people are still talking about how well these tools work and the problems that come with them.

Objective: This study is meant to look through existing research about using digital learning tools in early childhood education and find out what benefits they offer, the difficulties people face, and what new research is happening in this area.

Methods: A systematic literature review was conducted using the PRISMA framework. Relevant studies indexed in the Scopus database and published between 2018 and 2025 were identified, screened, and analyzed. Following the selection process, 96 studies met the inclusion criteria and were included in the review.

Results: The findings reveal that digital learning tools positively contribute to children's cognitive development, learning engagement, creativity, language acquisition, and collaborative skills. However, several challenges were identified, including limited teacher digital competence, unequal access to technological resources, concerns regarding excessive screen time, and insufficient parental involvement. The results also emphasize the importance of aligning technology integration with appropriate pedagogical practices.

Conclusion: Digital learning tools offer significant opportunities to enhance early childhood education when implemented effectively. Addressing existing challenges through teacher training, equitable access to technology, and stronger parental support is essential to maximize learning outcomes. The review provides valuable insights for educators, policymakers, and researchers in advancing technology-enhanced learning in ECE.

Keywords: Elearning Tools, Early Childhood Education, Educational Technology, Systematic Literature Review, Prisma.

1. INTRODUCTION

The fast growth of digital technology has changed many parts of education, including how young children learn. (Hatzigianni et al., 2023). In recent years, digital learning tools such as educational applications, interactive multimedia, online learning platforms, digital games, and virtual learning environments have been increasingly integrated into teaching and learning activities for young children (Lindeman et al., 2021). The use of these technologies has become more common because they are considered capable of creating learning experiences that are more engaging, interactive, and enjoyable for children (Rahiem, 2021). Unlike traditional teaching methods, digital learning tools provide visual, audio, and interactive elements that can attract children's attention and encourage active participation during the learning process (Özdemir, 2024).

In early childhood education, children learn most effectively through exploration, play, and direct interaction with their environment (Korur et al., 2025). Digital technology can support these learning characteristics by providing educational content that is adaptive, creative, and child-centered (Engelbrecht & Borba, 2023). Interactive educational applications, for example, allow children to develop problem-solving skills, recognize letters and numbers, improve language abilities, and strengthen early literacy skills through enjoyable activities (Supawi et al., 2025). Furthermore, digital storytelling applications and multimedia platforms can stimulate children's imagination,

creativity, and communication skills by combining pictures, sounds, animations, and interactive features into learning activities (Tawafak et al., 2023) .

The growing use of digital learning tools became even more important during the COVID-19 pandemic, as schools and educational institutions had to switch to online learning systems (Mustafa et al., 2024). During this period, teachers, parents, and students relied heavily on digital platforms to continue educational activities from home (Nurhikmah et al., 2024). This situation highlighted the important role of technology in supporting educational continuity and demonstrated that digital learning tools could become an essential component of modern education systems (Adhe et al., 2025). In addition, technology integration in early childhood education is considered beneficial for preparing children to live in a digital society where technological skills are increasingly important for future learning and communication (Nurhikmah et al., 2024).

Even though there are many good things about using digital technology in early childhood education, there are also some major challenges that come with it (Laid & Adlaon, 2025). One major issue is the limited digital competence of teachers. Many early childhood educators still lack sufficient training and confidence in using technology effectively in classroom instruction (Dardanou et al., 2023)d. As a result, some teachers may use digital tools only for basic activities without fully integrating them into meaningful pedagogical practices (Corbeil & Corbeil, 2025). Also, not everyone has the same chance to use digital tools and the internet, which is a big issue, especially in rural areas and places where people have less money (Eden et al., 2024). This digital divide can create educational inequalities among children from different social and economic backgrounds (Supawi et al., 2025).

Another worry is about too much time spent looking at screens and how it might affect kids' bodies, feelings, and how they get along with others (Masoumi & Bourbour, 2024). Parents and educators often worry that prolonged use of digital devices may reduce children's opportunities for physical play, face-to-face interaction, and social communication (Balcha et al., 2025). If technology is not used appropriately, children may become overly dependent on digital entertainment rather than engaging in active and collaborative learning experiences (Muthmainah & Kurniasari, 2025). Therefore, the use of digital learning tools in early childhood education should be carefully balanced with play-based activities, social interaction, and physical exploration to support children's holistic development.

Considering both the opportunities and challenges of technology integration, it is important to conduct a systematic literature review to better understand the effectiveness, benefits, limitations, and future directions of digital learning tools in early childhood education (Sauli et al., 2026). A thorough look at past research can offer useful ideas to teachers, researchers, and decision-makers when creating good plans for using technology in a way that helps kids learn and grow in a safe, meaningful, and friendly environment (Xue et al., 2025).

Digital learning tools are tech-based gadgets, software, and online systems that help teachers and students in the process of learning and teaching (Sangboonraung et al., 2024). In the context of early childhood education, digital learning tools include a wide range of technologies such as educational games, digital storytelling applications, multimedia learning systems, augmented reality (AR), interactive videos, e-books, and other child-friendly educational applications (Fragkaki et al., 2025). These technologies are becoming more common in early childhood classrooms because they provide fun and interactive ways for young kids to learn, which matches how children develop at that age (Aldhilan, 2024). Through visual, audio, and interactive features, digital learning tools can help children become more active and enthusiastic participants during learning activities (Aktürk & Akman, 2024).

Studies have found that using digital tools in early learning can help kids stay more interested and develop their thinking skills better (Aldhilan, 2024). Educational games and interactive applications, for example, can improve children's attention, memory, problem-solving abilities, and early literacy skills (Mandarani & Megawati, 2024). Multimedia learning environments also allow children to learn through images, sounds, animations, and hands-on activities, making the learning process more enjoyable and easier to understand. Digital storytelling tools can help kids learn language and be creative by letting them share their thoughts, hear stories, and talk with others in fun and engaging ways. (Tamimi, 2024).

Technology-based learning approaches are also closely connected to constructivist learning theory, which emphasizes the importance of active exploration, direct experience, and interaction in children's learning processes (Canaslan-Akyar et al., 2024). According to this theory, children learn most effectively when they are actively involved in discovering knowledge rather than simply receiving information from teachers (Pakpahan & Saragih, 2022). Digital learning tools support this approach by providing opportunities for children to explore educational content independently, solve problems, and participate in creative learning activities (Trifunović et al., 2024). Interactive technologies also encourage collaboration and communication among children, which are important aspects of social and emotional development (Güntepe & KELEŞ, 2023).

However, despite the many benefits offered by digital learning tools, their use in early childhood education must be carefully managed and balanced with traditional play-based activities and direct social interaction

(Yelland, 2018). Young children still need opportunities to engage in physical play, communicate face-to-face with peers and teachers, and explore their surrounding environment directly (Wilson et al., 2023). Excessive reliance on digital devices may reduce opportunities for social interaction, physical movement, and emotional development if not supervised appropriately. Therefore, technology should not replace traditional learning experiences but should instead complement and enrich children's overall learning process (Elias, 2025).

Furthermore, the successful integration of digital learning tools depends greatly on the role of teachers and parents in guiding children's technology use. Educators need sufficient digital competence and pedagogical understanding to select appropriate technologies that support children's developmental needs. Likewise, parents play an important role in monitoring screen time and ensuring that children use digital devices in safe, meaningful, and educational ways. Consequently, effective technology integration in early childhood education requires collaboration among teachers, parents, schools, and policymakers to create balanced and supportive digital learning environments for young children.

2. METHODS

This study used the Systematic Literature Review method, following the PRISMA approach, to find, select, review, and analyze studies about digital learning tools in early childhood education (SEÇİM & Toledo, 2023). The SLR method was chosen because it provides a systematic, transparent, and structured process for reviewing previous research findings. Through this method, researchers are able to collect and synthesize evidence from various studies comprehensively, allowing a deeper understanding of current research trends, major findings, and existing research gaps in the field of digital learning in early childhood education (Limone & Simone, 2020).

The primary database used in this study was Scopus, which is recognized as one of the largest and most reliable international academic databases containing high-quality peer-reviewed journals from various disciplines. Scopus was selected because it offers broad coverage of international publications and provides access to reputable scientific articles that are widely cited in educational research. Using Scopus also helps ensure the credibility, relevance, and academic quality of the studies included in this review.

The literature search process was conducted using several keywords and keyword combinations related to the research topic. The main keywords included "digital learning tools," "early childhood education," "educational technology," and "interactive learning." These keywords were selected to capture studies discussing the integration of technology and digital media in teaching and learning activities for young children. Boolean operators such as "AND" and "OR" were also applied during the search process to obtain more relevant and comprehensive search results.

The articles included in this review were limited to international journal articles indexed in Scopus and published between 2018 and 2025. This publication range was chosen to ensure that the reviewed studies reflect recent developments and current trends in digital technology integration within early childhood education. Only articles from academic journals that have been reviewed by experts in the field and are written in English were used in the analysis to ensure the literature is of high quality and consistent. The study did not include conference papers, book chapters, dissertations, or publications written in languages other than English.

The article selection process followed the PRISMA guidelines, which include four main steps: finding articles, checking them for relevance, deciding if they meet the criteria, and finally including them in the study (Moshood et al., 2024). During the identification stage, all potentially relevant articles were collected from the Scopus database using the selected keywords. In the screening stage, duplicate articles and studies that were not directly related to the topic were removed based on their titles and abstracts (Priyadarshini et al., 2024). The remaining articles were then evaluated in the eligibility stage through full-text reading to determine whether they met the inclusion criteria. Only articles from academic journals that have been reviewed by experts in the field and are written in English were used in the analysis to ensure the literature is of high quality and consistent. The study did not include conference papers, book chapters, dissertations, or publications written in languages other than English.

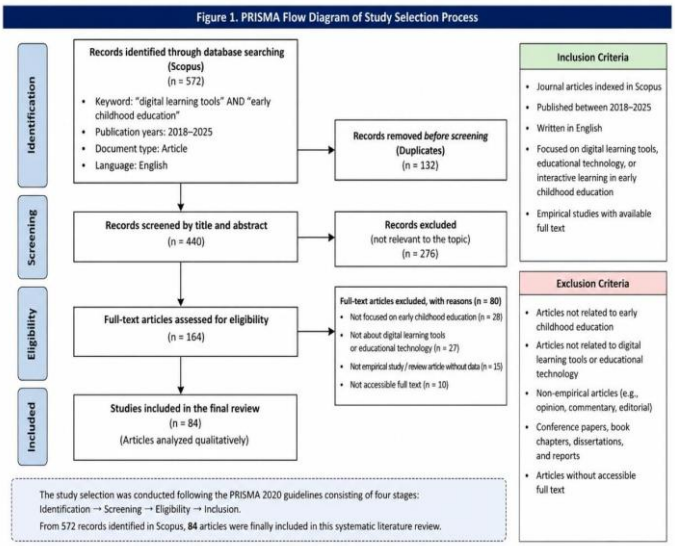

Figure 1. Prisma flow diagram of study selection prosecess

3. RESULTS AND DISCUSSION

3.1 Result

The findings from this systematic literature review show that there has been a big increase in research about digital learning tools used in early childhood education, particularly since the COVID-19 pandemic started. During the pandemic, schools and universities worldwide had to switch to online learning using technology. This made researchers focus more on how digital tools affect children's education (Dong et al., 2020).

As a result, studies discussing digital learning applications, virtual classrooms, interactive media, and online educational platforms for young children became more widely published in international journals. More and more articles are being written, which shows that teachers, researchers, and government officials are becoming more aware of how important it is to use technology in early childhood education. More and more researchers are looking into how digital tools can help kids grow in their thinking, social skills, emotions, and language abilities. Many studies also look into finding good ways to use technology in learning environments that are based on play, which is suitable for young kids. The fast growth of digital technology and the wider availability of the internet around the world have also helped make research in this area grow more quickly.

Furthermore, the way research is published shows that most studies come from countries that have strong technology systems, like the United States, the United Kingdom, Australia, and many European nations. In recent years, more research has been done in developing countries, showing that digital learning for young children has become a major issue in education around the world. Overall, the growing publication trend demonstrates that digital learning tools are now considered an important component of modern early childhood education systems. The reviewed studies identified several types of digital learning tools that are commonly used in early childhood education. These technologies include educational applications, digital storytelling platforms, interactive multimedia, augmented reality (AR), educational games, and virtual learning platforms (Papadakis et al., 2018).

Each type of technology offers different functions and learning experiences that support children's developmental needs. Educational applications are among the most widely used digital tools because they provide interactive learning activities related to literacy, numeracy, colors, shapes, and problem-solving skills. Many educational apps are designed using colorful visuals, sounds, animations, and game-based activities that can attract children's attention and increase their motivation to learn. Digital storytelling platforms are also widely used to support language development and creativity by allowing children to listen to stories, interact with characters, and create their own narratives. Interactive multimedia tools combine images, videos, sounds, and animations to create more engaging learning experiences.

These technologies help children understand learning materials more easily because young children generally learn better through visual and auditory stimulation. In addition, augmented reality technologies provide immersive learning experiences that enable children to explore objects and concepts in more interactive ways. Virtual learning platforms became increasingly important during the COVID-19 pandemic because they allowed teachers, parents, and students to continue learning activities remotely. These platforms support communication, assignment sharing, and online interaction between teachers and children. Among all digital learning tools, educational games remain one of the most popular technologies because they combine

learning with play activities, which are highly suitable for children's learning characteristics (Marsh et al., 2018).

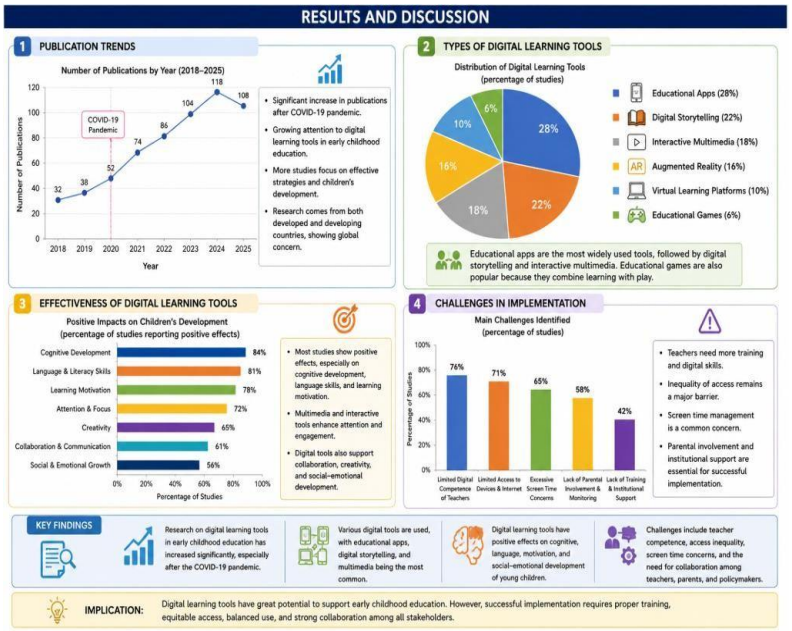

Figure 2. Result and Discussion

3.2 Discussion

Most of the studies in this review said that digital learning tools help children learn and grow in a positive way. One of the most common things people notice is that kids' thinking skills get better, like their ability to remember things, focus, solve problems, and think carefully (Neumann, 2018). Interactive learning activities encourage children to actively participate in the learning process and help them better understand educational content. Digital learning tools also contribute significantly to children's language and literacy development. Educational applications and digital storytelling platforms can improve vocabulary acquisition, reading readiness, listening skills, and communication abilities.

Children become more motivated to learn language through engaging visual and audio features that make learning more enjoyable and less stressful. In addition, multimedia learning tools help increase children's motivation, focus, and attention during learning activities (Arnott, 2020). Young children are naturally attracted to colorful images, animations, music, and interactive content. Therefore, technology-based learning environments can create more stimulating educational experiences compared to traditional teaching methods alone.

Gamification elements such as rewards, points, and challenges also encourage children to remain actively involved in learning activities. Several studies further revealed that digital technologies support children's creativity and collaboration skills. Through project-based activities, educational games, and collaborative digital platforms, children can work together, exchange ideas, and communicate with peers more effectively (Howard et al., 2021). These activities not only support academic development but also contribute to social and emotional growth. Overall, the findings suggest that digital learning tools can become effective educational resources when integrated appropriately into early childhood learning environments.

Although digital learning tools provide many educational benefits, their implementation in early childhood education also faces several important challenges. One major challenge is the limited digital competence of teachers. Many early childhood teachers still don't have enough knowledge about technology and teaching methods to use digital tools well in their lessons (Nikolopoulou, 2020). Some teachers might find it challenging to use educational technology or pick digital materials that are right for kids' age and learning stages. Another big problem is that not everyone has the same chance to use digital tools and get online, especially in poorer countries and places that are not near big cities (Livingstone & Helsper, 2020).

Not all children have access to smartphones, tablets, computers, or stable internet connections at home. This digital divide creates inequalities in learning opportunities and may prevent some children from benefiting fully from digital education. Concerns regarding excessive screen time are also widely discussed in the literature. Parents and educators worry that prolonged use of digital devices may negatively affect children's physical health, social interaction, emotional development, and attention span if not properly supervised (Kewalramani et al., 2020). Excessive exposure to screens may reduce opportunities for physical play, outdoor activities, and direct communication with peers and family members.

Furthermore, the successful implementation of digital learning tools often depends on parental involvement and support. Young children require guidance and supervision when using digital technologies, especially

during online learning activities conducted at home. Without proper monitoring, children may use devices for entertainment purposes rather than educational activities. Therefore, collaboration between teachers, parents, schools, and policymakers is essential to ensure that digital learning tools are used safely, effectively, and appropriately in early childhood education settings.

3.2.1 Implication

Digital learning tools have great potential to support early childhood education. However, successful implementation requires proper training, equitable access, balanced use, and strong collaboration among all stakeholders. The review highlights the importance of integrating pedagogical approaches with technology to maximize learning outcomes. Technology should not replace traditional learning experiences but should instead complement and enrich children's overall learning process. Consequently, effective technology integration in early childhood education requires collaboration among teachers, parents, schools, and policymakers to create balanced and supportive digital learning environments for young children.

3.2.2 Research Contribution

This study helps us better understand the current trends in research about using digital tools in early childhood education around the world. By using the PRISMA framework, this study made sure the review process was done in a clear, fair, and open way, which helped cut down on bias and made the results more trustworthy. The synthesis of 84 articles from the Scopus database provides a comprehensive overview of how digital learning tools have been used, including their explicit benefits and structural barriers, which serves as a valuable baseline mapping for future scientific educational research.

3.2.3 Limitation

Although this systematic literature review provides comprehensive insights, its scope was limited strictly to international journal articles indexed in the Scopus database published between 2018 and 2025. Non-English publications, conference papers, book chapters, dissertations, and reports were excluded from the analysis, which may have omitted relevant localized insights or regional project reports regarding digital tool usage. Furthermore, the findings are bound to the core challenges identified within the literature, such as limited teacher competence, unequal device access, and varying degrees of parental infrastructure support across different socio-economic backgrounds.

3.2.4 Suggestion

Based on the challenges identified, several key suggestions are offered for various stakeholders to optimize the integration of digital technology in early childhood education. For educators, it is crucial to actively pursue digital competence and pedagogical training to confidently select and incorporate child-friendly digital resources into classroom instructions, ensuring technology is utilized for meaningful learning rather than just basic activities. At home, parents must establish active supervision, monitor screen time parameters, and ensure that home-based technological usage remains strictly educational and well-balanced with physical play and offline social interactions. Moreover, schools and government leaders should create focused support systems to help close the gap in access to technology in rural or poorer regions, and also offer ongoing training for teachers who work with young children. For future researchers, it's strongly suggested that upcoming studies look more closely at real-world testing or long-term effects of advanced technologies like augmented reality (AR) and virtual learning environments, in a wider range of different groups of people, to better understand how these technologies affect education over time.

4. CONCLUSION

This study shows that there are big missing parts in the way teachers are trained for special education, especially in programs that only cover one course. The results show that these courses give basic understanding of inclusion, but they don't prepare student teachers with the right skills and ongoing help needed to manage classrooms that include a wide range of students. The people involved in the study talked about how their training didn't connect well to real-life situations, they didn't get enough guidance from mentors, and they felt the need for ongoing learning and growth in their careers. These results match the ideas from Vygotsky's Sociocultural Theory, which focuses on how talking with others, working together, and getting help from a guide are important for learning. Teacher training programs that don't include these elements don't properly prepare teachers for the challenges of teaching in an inclusive classroom. The study also supports earlier findings that short, one-course programs for special education training do not fully prepare teachers to handle the challenges of inclusion. So, we need a better, more connected way to train teachers so they are fully ready to support every student in inclusive classrooms.

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6. AUTHOR CONTRIBUTION STATEMENT

The authors worked together to come up with the ideas and finish the study. The first author was the main person in charge of the study. They came up with the overall plan for the research, did the search for existing studies following the PRISMA guidelines, collected the main data from the sources, and wrote the first version of the paper. The second author helped check the research plan, supported the process of reviewing and assessing full texts, explained the results, and carefully revised the manuscript to ensure it met academic standards. All the authors have read, improved, and agreed to the final version of the manuscript before it was published.

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