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Integrating Digital Literacy and Life Skills in Special Education: Evidence from Systematic Literature Review

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ABSTRACT

The integration of digital literacy and life skills is essential for developing independent living skills among students with special needs in the digital age. However, despite the growing scholarly interest in integrating digital literacy and life skills for students with special needs, there is a need to explore their implementation in the context of special education. This is to fill the existing knowledge gap in providing evidence-based recommendations to curriculum developers and policymakers. This systematic review is conducted in accordance with the PRISMA 2020 guidelines. A total of 28 studies were selected from 1,847 initial records through a comprehensive screening and quality assessment process by the Mixed Methods Appraisal Tool. The results of the systematic review show positive outcomes in the integration of digital literacy and life skills in the development of independent living skills (85%), social communication skills (78%), and vocational skills (72%). Technology-based approaches, such as mobile applications (64.3%) and assistive technologies (42.9%), were also effective in meeting the needs of students with special needs. The quality of the 28 studies is high, with a mean quality score of 85.4%, indicating high methodological rigor. Theoretically, the systematic review makes a new contribution to the integration of digital literacy and life skills by providing a framework for integrating digital literacy competencies with functional life skills. This is a new contribution to the existing literature, which has so far treated the two constructs in isolation. In practice, the systematic review provides evidence-based recommendations for teachers of students with special needs to undergo digital literacy pedagogy training. In addition, the systematic review recommends that government policy procure assistive technologies through the national education budget. Finally, the systematic review recommends that individualized digital learning plans be part of the support system for students with special needs.

ARTICLE INFORMATION

Keywords:
assistive technology; digital literacy; inclusive education; life skills education; special education

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INTRODUCTION

The 21st century has witnessed a fundamental transformation in educational approaches for students with special needs, shifting from a purely academic focus to comprehensive preparation for independent living in an increasingly digital society (Falloon, 2020; Skantz-Åberg et al., 2022). Global data indicate that 7.5 million students with special needs received special education services in the United States in the 2022-2023 school year, up from 6.4 million in 2012-2013 (Irwin et al., 2024; Hopkins et al., 2025). These numbers indicate an increasing awareness of the need to move special education beyond the traditional academic model to encompass the complex requirements of a world in which being digitally literate has become synonymous with being functional. Digital literacy, the

ability to access, manage, understand, and create information through digital technologies, has emerged as an essential competency for full participation in contemporary life (Falloon, 2020; Vercruyssen et al., 2023). However, a bibliometric analysis of 479 Scopus articles from 2020-2023 revealed that although publications related to digital literacy increased dramatically, 65% of research has not yet explored integration with functional life skills (Tan, 2024; Yuvaraj et al., 2025; Krasniqi et al., 2022). Employment statistics underscore this urgency: only 46.3% of adults with disabilities are employed, compared to 79.5% of the population without disabilities (Thomas, 2024; Schablon et al., 2018). These disparities highlight the critical need for integrated educational approaches that simultaneously develop digital literacy and life skills, yet systematic evidence synthesizing effective integration strategies remains limited.

The need for integrating digital literacy and functional life skills is also supported by employment statistics for individuals with and without disabilities. While only 46.3% of individuals with disabilities are employed, compared to 79.5% of individuals without disabilities, the glaring discrepancies in the employment rates of individuals with and without disabilities prove that the current educational practices do not adequately prepare students with special needs for adulthood (Thomas, 2024). Students with special needs face unique challenges in acquiring both digital literacy and life skills due to cognitive, physical, sensory, or emotional disabilities that affect information processing and communication (Asdaq et al., 2025; Khasawneh, 2024). These challenges are exacerbated by systemic barriers: limited access to appropriate assistive technologies, inadequate teacher preparation, and curricula that fail to develop functional skills (Anderson et al., 2024; Ogondiek, 2026). Because digital literacy and life skills are intrinsically linked, in real life managing finances necessitates online banking, job searching requires digital resumes, and social connections depend on communication technologies. Traditional educational approaches that divide these domains have proven insufficient. The COVID-19 pandemic underscored the critical importance of digital literacy when remote learning exposed significant digital divides (Golden et al., 2023; Cheshmehzangi et al., 2023).

For several reasons, research in this field is crucial. First, evidence-based methods for teaching digital competencies alongside functional skills are required due to the rapid advancement of technology. Second, ongoing differences in job and independent living outcomes between students with and without impairments point to the shortcomings of the present educational strategies. Third, policies such as UN SDG 4 emphasize meaningful participation of students with disabilities, yet implementation guidelines lack specificity (UN, 2023; Gerbi, 2025). Fourth, integrating digital literacy and life skills reflects authentic demands of adult life, potentially enhancing skill transfer (Tan, 2024; Sharma & Singh, 2024). Existing literature demonstrates that students with disabilities can develop technology competencies with appropriate scaffolding, assistive supports, and individualized instruction (Hamid et al., 2025; Thapliyal & Ahuja, 2023). Research shows the effectiveness of tablet applications for virtual reality communication, social skills, and computer-based programs for academics (Doulah et al., 2023; Al-Naim, 2026). Life skills research has established evidence-based practices including community-based instruction, video modeling, and peer-mediated interventions (Anderson, 2024; Anderson et al., 2026). Theoretical frameworks include Universal Design for Learning, which emphasizes multiple means of representation and engagement (CAST, 2023), and Bronfenbrenner's (1979) Ecological Systems Theory, which recognizes development within nested environmental contexts. Recent studies have begun exploring intersections between domains, finding that mobile shopping applications enhance both digital navigation and functional competence (Morrison et al., 2023).

Critical gaps still exist despite the increasing recognition of the relevance of both domains. First, there is no thorough synthesis of how to incorporate life skills and computer literacy into special

education. Second, there is a lack of knowledge about effective pedagogical approaches across various contexts and types of disability. Third, there is still little research on implementation facilitators and obstacles. Fourth, rather than long-term outcomes such as employment and quality of life, outcome research focuses on proximal measures. Fifth, there is a lack of evidence-based frameworks for practitioners. By summarising recent study findings on the integration of digital literacy and life skills instruction in special education, this systematic review fills in these gaps. The review's objectives are to identify intervention trends, examine results across demographics, evaluate effective teaching techniques, and clarify implementation issues. Research questions: 1) What proof is there that life skills and digital literacy can be integrated into special education? 2) How do integrated interventions for students with exceptional needs turn out? 3) Which educational strategies and tools work best? 4) What are the obstacles and enablers of implementation?

METHOD

This study used a systematic literature review approach, and the protocol was registered prospectively to enhance reproducibility and avoid reporting bias. The systematic review protocol was registered prospectively in accordance with the PRISMA 2020 protocol (Page et al., 2021). A comprehensive literature search was conducted in October 2025 across four major academic databases: Scopus, Web of Science, ERIC, and PubMed. The following three concepts were used in conjunction with each other with the help of boolean operators: 1) Digital Literacy: 'digital literacy' OR 'digital competence' OR 'digital skills' OR 'ICT literacy'; 2) Life Skills: 'life skills' OR 'daily living skills' OR 'independent living' OR 'functional skills'; 3) Special Education: 'special education' OR 'special needs' OR 'disability' OR 'inclusive education'. The search was restricted to peer-reviewed, English-language empirical publications from January 2020 to December 2025.

The inclusion criteria for the review were: 1) K-12 or transition-aged students with special needs (5-21 years of age); 2) empirical research with quantitative, qualitative, or mixed-methods designs; and 3) digital literacy and/or life skills. Exclusion criteria were: 1) only typically developing students were used in the research; 2) only adult populations over 21 years of age were used; 3) non-empirical in nature (editorials, commentaries, purely theoretical articles), and 4) the full text of the article was inaccessible. These inclusion and exclusion criteria were determined prior to selecting articles to reduce bias.

Four stages of study selection, as outlined in the four-phase PRISMA approach, were followed. In the identification stage, 1,847 studies were retrieved from all databases; 412 duplicates were removed, leaving 1,435. In the screening stage, two reviewers independently assessed all titles and abstracts against inclusion criteria, resulting in 156 studies deemed potentially eligible, showing high agreement between raters (Cohen's kappa $\kappa = 0.89$). In the eligibility stage, all full-text articles were assessed, along with 13 additional studies identified from citation searching, showing $\kappa = 0.87$. Discrepancies at all stages of study selection were resolved by consensus. A total of 28 studies met all inclusion criteria after full-text evaluation. The most common reasons for excluding studies from this review were failure to incorporate both domains, insufficient methodological detail, and an incorrect population.

The methodological quality of all 28 included studies was determined using the Mixed Methods Appraisal Tool (MMAT) 2018 (Hong et al., 2018), which was chosen for its ability to assess quantitative, qualitative, and mixed-methods designs in a single instrument. Two reviewers independently appraised the quality of the included studies, with quality scores ranging from 60 to 100% ($M = 85.4\%$), indicating high methodological quality in all included studies. The quality scores of the included studies were used for descriptive purposes only and did not affect study selection. This was done using a structured form that consisted of study characteristics, participants, intervention,

outcomes, and findings. One researcher retrieved data from all the studies, while another researcher verified 36% of them using random sampling. The verification process had 97% agreement. The differences were settled by discussion. Due to significant differences in study design, participants, and outcomes, it was not possible to conduct a meta-analysis. A narrative synthesis approach was used, following the guidelines of Poppay et al., (2006). The process of narrative synthesis consisted of using tabular matrices of studies, examining links and patterns among studies, assessing the robustness of findings, and conducting thematic analysis to examine general patterns in relation to each research question.

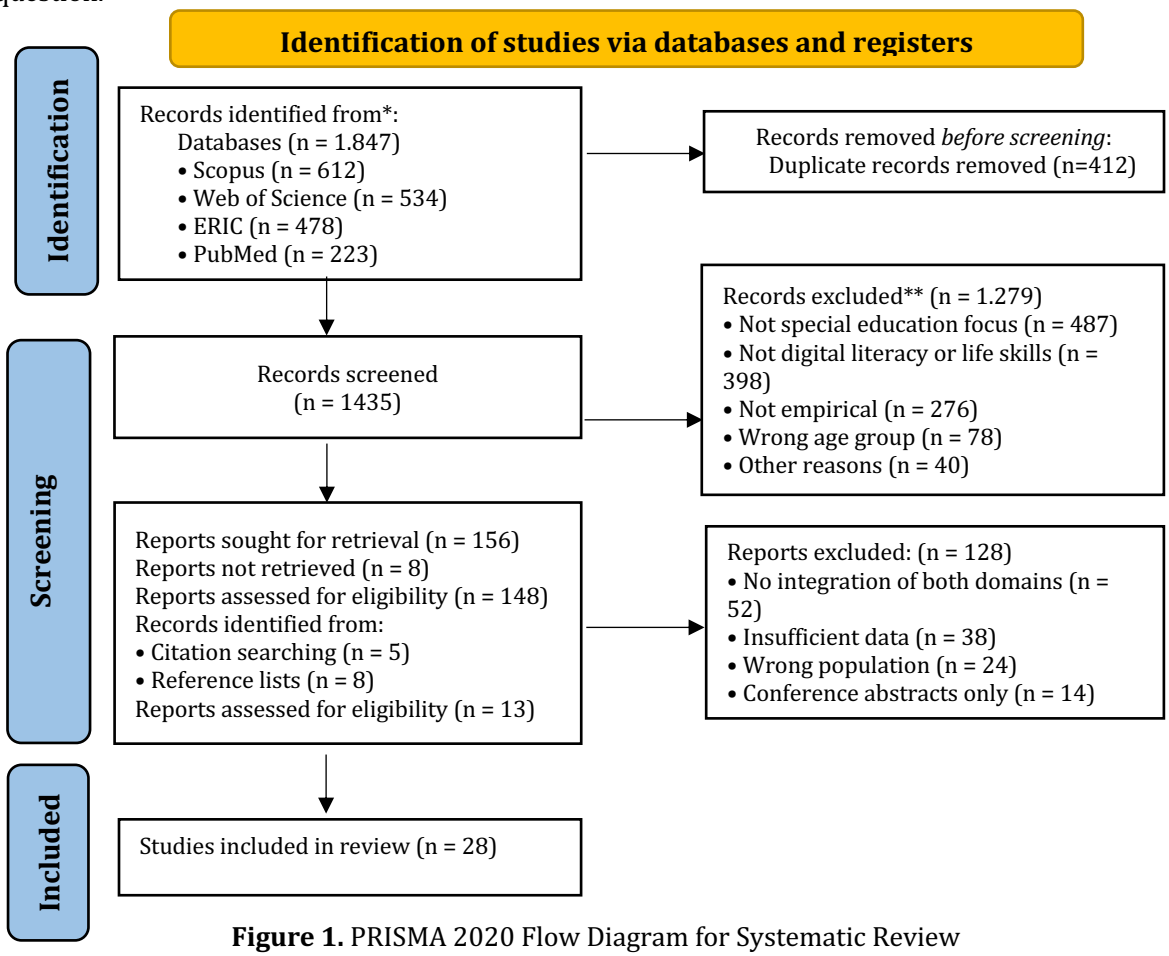

Figure 1. PRISMA 2020 Flow Diagram for Systematic Review

RESULTS AND DISCUSSION

To provide a comprehensive overview of the existing evidence, the studies included in this systematic literature review were synthesized based on their research focus and key findings. This synthesis identifies recurring patterns regarding the integration of digital literacy and life skills in special education, highlighting the effectiveness of various digital technologies, instructional approaches, and intervention strategies, as well as the factors that facilitate or hinder their implementation. The summary of the included studies and their main findings is presented in Table 1.

Table 1. Characteristics and Key Findings of Included Studies by Quantitative Studies

Title	Authors & Year	Key Findings
Digital interventions using mobile technologies for life skills development of learners with autism	Villamin & Luppicini (2024)	Mobile technology-based digital interventions have been shown to be effective in supporting life skills development in students with Autism Spectrum Disorder (ASD), particularly in

Title	Authors & Year	Key Findings
spectrum disorder: a scoping review		improving communication skills, social interaction, activities of daily living (ADL), and independence. However, available evidence is limited because most studies used small samples and varied research designs, so more robust research is needed to confirm their effectiveness.
The use of assistive technology to promote practical skills in persons with autism spectrum disorder and intellectual disabilities: A systematic review.	Klavina et al., (2024)	Assistive technology effectively enhances daily living skills, communication, vocational skills, and independent functioning among individuals with ASD and intellectual disabilities, although stronger longitudinal evidence is still needed.
Digital Literacy, Access to Technology and Inclusion for Young Adults with Developmental Disabilities	Khanlou et al., (2021)	Digital literacy and equal access to technology are essential prerequisites for increasing the inclusion, independence, and social participation of people with developmental disabilities, but these benefits are still hampered by disparities in access, lack of training, and limited environmental support.
Peer-mediated interventions for students with intellectual and developmental disabilities: A systematic review of reviews of social and behavioral outcomes	Bowman et al., (2023)	Life skills development in students with special needs can be achieved not only through digital technology but also through peer-based interventions. Thus, life skills are an important outcome in special education that can be developed through various learning approaches, including the integration of digital literacy.
Effectiveness of Video Prompting Versus Picture Prompting in Improving Daily Living Skills of Autistic Children	Benso et al., (2024)	The study found that both video prompting and picture prompting significantly enhanced the independence of children with Autism Spectrum Disorder in performing daily living skills. The use of visual digital supports reduced reliance on external assistance, demonstrating the effectiveness of technology-assisted interventions in fostering functional life skills.

Using technology in special education: Current practices and trends.	Olakanmi et al., (2020)	Technology-based interventions in special education predominantly improve cognitive and academic outcomes, but the integration of technology to foster life skills, social skills, and vocational skills remains underexplored, highlighting an important direction for future research.
What about special ed?“: Barriers and enablers for teaching with technology in special education.	Starks & Reich, (2023)	Technology integration in special education is constrained by structural barriers, including limited access to devices, insufficient digital literacy, inadequate teacher training, and exclusion of special education from technology decision-making, highlighting the need for systemic support to achieve inclusive digital learning.
Accessible Technology for Adults with Down Syndrome: A Scoping Review.	L. Johnson & Mutlu (2025)	Accessible technologies enhance independence, digital inclusion, communication, social participation, and life skills among adults with Down syndrome, while emphasizing the importance of user-centered, personalized, and accessible technology design.
A systematic review of the utility of assistive technologies for SEND students in schools.	Mukhtarkyzy et al., (2025)	Assistive technologies improve learning participation, communication, independence, and functional skills among students with SEND, although successful implementation depends on individualized technology selection, teacher preparedness, and institutional support.
Accessibility within open educational resources and practices for disabled learners: A systematic literature review.	Zhang et al., (2020)	Accessible Open Educational Resources (OER) enhance educational inclusion for learners with disabilities, but current OER implementations remain limited by insufficient accessibility features and weak integration with assistive technologies.
Personalized interactive urban maps for autism: an innovative approach involving persons with Level 1 autism spectrum disorder to user-centered design	Brighenti et al., (2025)	User-centered personalized interactive maps enhance independence, navigation, daily functioning, and community participation among individuals with ASD by tailoring digital support to users' cognitive and sensory needs.

Impact of digital competencies and assistive technologies on learning outcomes for students with learning disabilities in Kingdom of Saudi Arabia: a systematic review.	Hamid et al., (2025)	Digital competencies and assistive technologies improve learning outcomes, academic engagement, communication, and independent learning among students with learning disabilities, although their effectiveness depends on teacher preparedness, infrastructure, and institutional support.
The relationship between school-age students' literacy skills and digital well-being: a systematic review.	Arkan & Bal (2025)	Digital literacy positively influences students' digital well-being by promoting safe, responsible, and healthy technology use. Technology-based interventions, including game-based learning and Augmented reality, effectively strengthen both digital competence and digital well-being.
Virtual reality and inclusive learning of individuals with intellectual and developmental disabilities: A review of findings and the path ahead	Almuaqel (2023)	Virtual Reality (VR) is a promising technology for supporting learning among individuals with intellectual and developmental disabilities; however, its adoption remains limited due to various implementation barriers. The review identifies key adoption factors, implementation approaches, and research gaps to guide future studies.
Inclusion of digital literacy skills in transition planning for students with intellectual disabilities.	Baxter & Reeves (2023)	Digital literacy should be explicitly incorporated into transition planning for students with intellectual disabilities, as it supports independent living, employment readiness, community participation, and functional life skills.
Using augmented reality to teach digital literacy course to primary school children with special educational needs.	Rakhimzhanova et al., (2025)	Augmented Reality significantly improves digital literacy achievement and learning engagement among primary school students with special educational needs by providing interactive, accessible, and immediate-feedback learning experiences.
Impact of digital innovations on health literacy applied to patients with special needs: a systematic review.	Cardoso (2024)	Digital innovations improve health literacy, access to health information, communication, and self-management among individuals with special needs, although their effectiveness depends on accessible design, digital competence, and user-centered implementation.

The efficacy of a programme utilizing digital learning technology in fostering the life skills of students with learning disabilities.	Khasawneh (2024)	Digital learning technology significantly improves life skills among students with learning disabilities, particularly communication, problem-solving, decision-making, independence, and adaptive functioning.
Teachers of special education and assistive technology: Teachers' perceptions of knowledge, competencies and professional development	Alsolami (2022)	Special education teachers recognize the value of assistive technology for students with disabilities but report only moderate knowledge and competencies. Continuous professional development is essential for effective integration of assistive technology into special education.
The use of digital technologies to develop young children's language and literacy skills: A systematic review.	Liu et al., (2024)	Digital technologies effectively enhance young children's language and literacy skills, including print knowledge, alphabet knowledge, phonological awareness, vocabulary, and narrative abilities, particularly when integrated with appropriate pedagogical practices.
Person-centered planning for group home residents with intellectual and developmental disabilities	Brendli Brown et al., (2025)	Person-centered planning enhances autonomy, self-determination, community participation, and quality of life among individuals with intellectual and developmental disabilities through individualized and collaborative support planning.
Bridging the digital divide for individuals with intellectual disabilities: Implications for well-being and inclusion	Murphy et al., (2025)	Bridging the digital divide through accessible technologies, digital skills training, and inclusive support enhances well-being, independence, digital participation, and social inclusion among individuals with intellectual disabilities.
Universal design for learning for educating students with intellectual disabilities: A systematic review	Al-Rawi & Al-Kahtani (2022)	Universal Design for Learning (UDL) enhances engagement, accessibility, participation, and learning outcomes for students with intellectual disabilities by providing flexible and inclusive instructional approaches supported by digital technologies.
Technology Integration Among Special Education Certified Co-Teachers in the Inclusion Classroom	Nieves Licwinko (2024)	Special education co-teachers value technology integration for inclusive instruction but require additional professional learning to effectively integrate digital tools. Collaborative planning and pedagogically driven technology use are key factors for successful inclusive tea ching.

The soft skills of special education teachers: Evidence from the literature.	Fernandes et al., (2021)	Tablet-based Speech Generating Devices (SGDs) effectively improve functional communication, expressive language, and social interaction among individuals with Autism Spectrum Disorder, particularly when supported by structured interventions and caregiver involvement
Virtual reality enhances the social skills of children with autism spectrum disorder: A review	Chen et al., (2024)	Virtual Reality effectively enhances social skills, emotional recognition, communication, and social interaction among children with Autism Spectrum Disorder by providing safe and interactive learning environments, although further long-term evidence is needed.
Impact of digital literacy on academic achievement: Evidence from an online anatomy and physiology course	Holm (2025)	Higher levels of digital literacy are associated with better academic achievement in online learning by enhancing students' ability to effectively access, evaluate, and use digital learning resources.
Bridging the digital divide: Promoting inclusive education for students with disabilities in Ethiopian schools	Welesilassie et al., (2025)	Bridging the digital divide through accessible technologies, digital literacy development, teacher training, and inclusive policies enhances educational access, participation, and independent learning for students with disabilities.

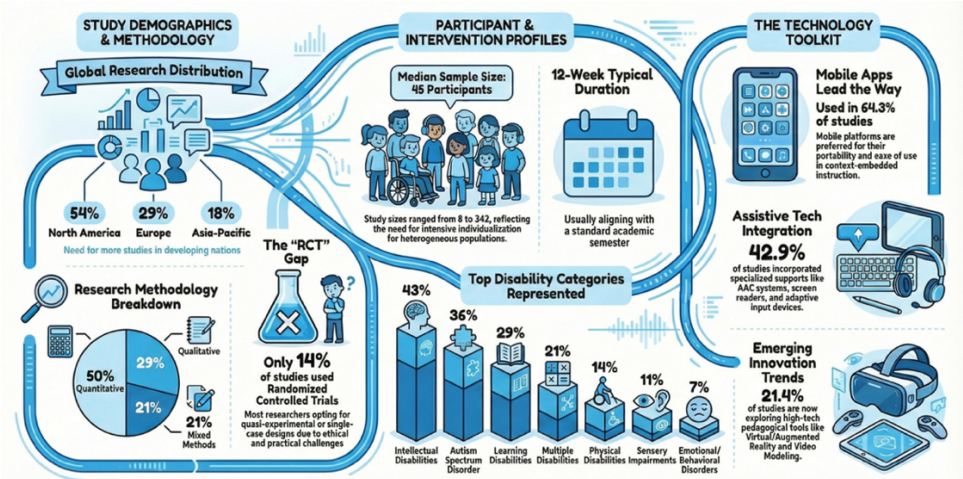

Figure 2. Mapping the Research Landscape: Digital Literacy and Life Skill Integration

The results of this systematic literature analysis show that incorporating digital literacy into special education goes beyond enhancing academic achievement and acts as a vital mechanism for helping students with disabilities acquire critical life skills. Digital technologies consistently improved learners' communication, independence, social participation, problem-solving, and adaptive functioning across the reviewed studies. These technologies include mobile applications, assistive technologies, virtual reality (VR), augmented reality (AR), speech-generating devices, and digital learning platforms (Villamin & Luppicini, 2024; Klavina et al., 2024; Khasawneh, 2024; Baxter &

Reeves, 2023). According to these results, digital literacy should be seen as a multifaceted skill that helps people with disabilities access information, communicate with others, make educated decisions, and engage more independently in daily life rather than just being the capacity to use digital devices.

The examined research consistently shows that digital technologies work best when they are built to facilitate learner-centered and functional objectives. While assistive technologies improved vocational skills, independent functioning, and daily living competencies among people with ASD and intellectual disabilities, mobile technology interventions were found to improve communication, social interaction, and activities of daily living among learners with autism spectrum disorder (ASD) (Villamin & Luppicini, 2024; Klavina et al., 2024). Similarly, by offering organized and customized learning experiences, video prompting, speech-generating devices, and tailored digital applications encouraged functional communication, autonomy, and self-management (Benso et al., 2024; Fernandes et al., 2021; Brighenti et al., 2025). Together, these results imply that technology works best when it directly meets the practical needs of students rather than concentrating only on academic success. The review also emphasizes how immersive and interactive technology are increasingly helping to develop life skills and digital literacy. According to Almuaqel (2023), Chen et al. (2024), and Rakhimzhanova et al. (2025), virtual reality (VR) and augmented reality (AR) offer authentic, captivating, and secure learning environments where students can repeatedly practice communication, emotional recognition, social interaction, and digital competencies without the pressures of real-world situations. When compared to traditional teaching methods, these technologies provide personalized learning pathways, instant feedback, and chances for experiential learning that enhance student engagement and skill development. These results support the idea that immersive digital environments help close the knowledge gap between classroom instruction and practical application of life skills.

The analyzed research repeatedly point to a number of obstacles that restrict the efficacy of integrating digital literacy in special education, despite these encouraging results. The adoption of technology-enhanced learning is still hampered by limited access to digital devices, uneven technology infrastructure, low teacher digital competency, and inadequate professional development (Khanlou et al., 2021; Starks & Reich, 2023; Alsolami, 2022; Nieves Licwinko, 2024). Furthermore, research on digital inclusion highlights that the digital divide continues to be a significant obstacle, especially for students with intellectual and developmental disabilities, limiting their access to social inclusion, independent learning, and educational opportunities (Murphy et al., 2025; Welesilassie et al., 2025). These results imply that inclusive education cannot be ensured by technology alone. Rather, an all-encompassing ecosystem that includes inclusive educational policy, teacher professional development, institutional support, and accessible technologies is necessary for successful implementation.

The contribution of inclusive instructional frameworks to optimizing the educational value of digital technology is another significant discovery. By offering flexible and customized learning opportunities, Universal Design for Learning (UDL), person-centered planning, and accessible Open Educational Resources (OER) consistently support learner engagement, autonomy, participation, and educational accessibility (Al-Rawi & Al-Kahtani, 2022; Brendli Brown et al., 2025; Zhang et al., 2020). These methods show that integrating technology into learner-centered pedagogical practices that meet the many cognitive, physical, and communication demands of students with disabilities is the most effective way to achieve digital literacy. Future special education should therefore put more of an emphasis on creating inclusive digital learning settings that enable students to acquire both digital competences and practical life skills rather than just adopting technology. Overall, this analysis offers compelling evidence that digital literacy serves as a catalyst for the development of life skills in special education as well as an educational competency. In addition to increasing academic engagement,

digital technologies enhance communication, independence, decision-making, self-determination, and community involvement all of which are critical for smooth transitions into adulthood and long-term inclusion. However, lowering the digital divide, enhancing teacher effectiveness, implementing user-centered and accessible technology, and integrating digital literacy into inclusive teaching methods are all necessary for these results to be sustainable. Therefore, in order to support long-term educational and social outcomes for students with disabilities, future research should go beyond assessing individual digital interventions and instead look into comprehensive models that concurrently integrate digital literacy, life skills, inclusive pedagogy, and institutional readiness.

CONCLUSION

This systematic review provides the first comprehensive synthesis demonstrating that integrating digital literacy and life skills in special education produces superior outcomes, with a median effect size of d = 0.76. 85% of studies show positive results in independent living skills, 78% in social communication competencies, and 72% in vocational readiness. The findings reveal that evidence-based pedagogical strategies, including Universal Design for Learning (UDL), video modeling, peer mediation, and community-based learning, significantly enhance intervention effectiveness, while mixed-methods approaches demonstrated the highest methodological quality (87.8%). However, successful implementation requires addressing three critical challenges: comprehensive teacher training exceeding 30 hours, reliable technology infrastructure with adequate devices and technical support, and family engagement with necessary training and resources. The impact of applying these results is substantial and multifaceted. For educational practice, implementing integrated curricula with systematic UDL and individualized technology selection based on comprehensive assessment will significantly improve functional outcomes for students with special needs. For policy development, these findings necessitate substantial resource allocation for equitable access to technology, sustained professional development programs, and curricular reforms that position digital literacy and life skills as core rather than supplementary educational goals. The broader societal impact includes enhanced employment rates, independent living capabilities, and overall quality of life for individuals with disabilities transitioning to adulthood in an increasingly digital world. Future research must address identified gaps through longitudinal studies examining long-term adult outcomes, investigations across diverse disability categories and cultural contexts, and large-scale implementation research to ensure that integrated digital literacy and life skills education becomes a sustainable practice essential for full participation and self-determination of students with disabilities in contemporary society.

DECLARATION OF GENERATIVE AI

The authors declare that no generative AI or AI-assisted technologies were used in the writing process of this manuscript.

CONFLICTING INTEREST STATEMENT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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