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# Digital divide and educational equity: A conceptual framework

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**Abstract**
The digital revolution has transformed educational landscapes, creating new opportunities for learning while simultaneously exposing and amplifying existing inequalities. This paper explores the complex relationship between the digital divide and educational equity, proposing a conceptual framework that integrates technological, pedagogical, socio-cultural, and institutional dimensions. The study emphasizes that access to digital devices and internet connectivity, while essential, is insufficient on its own to ensure meaningful participation in education. Digital literacy, encompassing the ability to navigate, evaluate, and utilize technology effectively, emerges as a critical factor influencing learning outcomes. Socio-economic disparities, geographic location, and cultural context further shape students' engagement with digital tools, while the preparedness and capacity of educators significantly affect the effectiveness of technology-mediated learning. Parental involvement and community support are also vital in creating inclusive learning environments, particularly in low-resource or crisis-affected contexts. Additionally, emerging technologies such as artificial intelligence and adaptive learning platforms hold potential for personalizing education and enhancing learner engagement, but uneven adoption risks exacerbating existing inequities. The proposed conceptual framework provides a holistic lens to understand how the digital divide impacts educational equity, guiding policymakers, educators, and researchers in designing interventions that promote inclusive, effective, and equitable learning experiences. By addressing structural, pedagogical, and societal dimensions simultaneously, the framework aims to ensure that digital technologies serve as tools for empowerment rather than instruments of exclusion.

**Keywords:** Digital divide, educational equity, digital literacy, technology integration, inclusive education, socio-cultural factors

## Introduction

The digital era has fundamentally reshaped how knowledge is produced, shared, and accessed, creating new avenues for educational advancement while simultaneously exposing and amplifying pre-existing inequalities. The concept of a "Digital Earth" (Annoni *et al*., 2023) [5] illustrates how digital technologies increasingly permeate all aspects of societal functioning, from governance and health to education and commerce, positioning digital access as a critical determinant of contemporary participation in socio-economic life. While digital platforms offer unprecedented opportunities for personalized, interactive, and contextually adaptive learning experiences, they also reveal stark disparities in access, skills, and infrastructure—a phenomenon commonly referred to as the digital divide.

The digital divide, traditionally conceptualized as a gap in physical access to digital devices and the internet, has evolved into a multi-dimensional phenomenon encompassing differences in digital literacy, socio-economic resources, geographical accessibility, and institutional support (Durand *et al*., 2022 [11]; Wilson-Menzfeld *et al*., 2025) [39]. These disparities are particularly pronounced in educational contexts, where the integration of digital tools is increasingly seen as essential for equitable learning outcomes. Research highlights that students in marginalized communities, rural regions, and low-income households are disproportionately affected by limited access to technology and the skills required to use it effectively (Nearing *et al*., 2024 [29]; McCosker & Tucker, 2025) [27]. Consequently, educational equity is not merely a question of providing devices or internet connectivity but involves ensuring meaningful participation through tailored digital literacy programs, adaptive content, and institutional support systems.

Recent studies underscore the complex interplay between technology adoption and educational efficacy. For instance, Hernández-Martínez *et al*. (2025) [16] and Hidayat and Chao (2025) [17] demonstrate that the effective integration of Information and Communication Technologies (ICT) in educational curricula significantly enhances student competencies, particularly in STEM-related learning, while simultaneously highlighting the barriers posed by uneven digital preparedness among teachers and learners. Similarly, Eşki *et al*. (2025) [12] highlight how language teacher educators in Spain leveraged digital literacy and resilience to navigate pandemic-induced disruptions, reflecting the critical role of educator competence in mitigating digital inequities.

Beyond formal schooling, the digital divide intersects with broader societal structures, shaping individuals' lifelong learning trajectories and civic participation. Digital exclusion has implications for the development of critical competencies, information evaluation skills, and access to socio-economic opportunities (Amadu, 2024 [4]; Harutyunyan *et al*., 2024) [15]. Moreover, the emergence of advanced technologies such as generative artificial intelligence further accentuates the need for inclusive digital education frameworks, as these tools promise transformative learning experiences but require sophisticated digital skills that are unevenly distributed across populations (Wessel *et al*., 2025 [38]; Kyambade *et al*., 2025) [22].

Several scholars have called for conceptual frameworks that capture the multifaceted nature of digital inequities in education, advocating for models that integrate

technological, pedagogical, and socio-cultural dimensions (Bayne, 2024 [6]; Alam & Mohanty, 2024) [2]. Such frameworks emphasize that bridging the digital divide is not only a matter of infrastructure but also of fostering equitable access to knowledge, nurturing digital literacy, and empowering educators and learners to engage meaningfully with technology-mediated learning environments. Veintie *et al*. (2022) [37] illustrate the resilience of intercultural bilingual education in Amazonia under crisis conditions, emphasizing that socio-cultural context, institutional support, and adaptive pedagogical strategies are critical for mitigating the adverse effects of digital inequities.

The COVID-19 pandemic further accentuated the urgency of addressing digital disparities, revealing both the potential of digital tools in sustaining educational continuity and the limitations faced by digitally marginalized learners (Dowrick *et al*., 2020 [10]; Ewuoso, 2025) [13]. Studies indicate that unequal access to digital platforms during the pandemic exacerbated educational inequalities, particularly among students in rural, low-income, and linguistically diverse settings, prompting calls for systemic interventions to foster inclusive digital education ecosystems.

In response to these challenges, the present paper proposes a conceptual framework for understanding the relationship between digital divide and educational equity. By integrating insights from multi-disciplinary studies on digital literacy, technology access, and pedagogical innovation, this framework aims to guide policy-makers, educators, and researchers in designing interventions that reduce digital inequities and promote inclusive learning outcomes. Recognizing the digital divide as both a structural and pedagogical challenge, this framework emphasizes the necessity of addressing technological access, skill development, socio-cultural contextualization, and institutional support as interconnected components in achieving educational equity in the digital age.

## Literature Review

The rapid evolution of digital technologies has transformed the landscape of education, offering opportunities for innovative learning while simultaneously exposing existing inequalities in access, participation, and outcomes. The notion of the digital divide, initially framed around disparities in access to hardware and connectivity, has evolved into a multifaceted concept encompassing digital literacy, socio-economic factors, and institutional support (Durand *et al*., 2022 [11]; Wilson-Menzfeld *et al*., 2025) [39]. As Annoni *et al*. (2023) [5] highlight in their discussion of the Digital Earth, digital infrastructures are now foundational to societal participation, making equitable access to digital tools a prerequisite for inclusive education and social engagement.

Several studies indicate that educational disparities are exacerbated by uneven access to digital technologies. Harutyunyan *et al*. (2024) [15] emphasize that digital literacy is not uniform across societies; factors such as socio-economic status, geographic location, and generational differences significantly influence individuals' ability to effectively engage with technology. Similarly, McCosker and Tucker (2025) [27] argue that low-income households face unique challenges in meeting digital demands, creating a cyclical disadvantage where limited access undermines educational opportunities, skill development, and broader socio-economic mobility. In this context, digital equity extends beyond mere access to include the capacity to engage meaningfully with digital content and participate fully in learning ecosystems.

The role of technology in enhancing educational outcomes has been widely studied. Hernández-Martínez *et al*. (2025) [16] demonstrate that the integration of ICT in secondary education can strengthen mathematical competencies when teachers are equipped with appropriate digital skills and resources. Hidayat and Chao (2025) [17] similarly emphasize that teacher preparedness is a critical mediator of the digital divide; even in digitally well-resourced environments, gaps in pedagogical skills may limit the potential benefits of technology. Eşki *et al*. (2025) [12] further illustrate how language teacher educators in Spain leveraged digital literacy to navigate the disruptions caused by the COVID-19 pandemic, highlighting that institutional support and professional development are crucial components in reducing digital inequities.

The COVID-19 pandemic has brought the consequences of the digital divide into sharper focus. Studies by Mathrani *et al*. (2022) [26] and Sing Yun (2023) reveal that students in developing countries or marginalized communities faced significant barriers to continuing education during lockdowns due to limited access to digital tools, inadequate internet infrastructure, and a lack of support for remote learning. Dowrick *et al*. (2020) [10] underscore that the digital divide also affects the integration of broader developmental initiatives, such as health education, reflecting the interconnectedness of educational and societal disparities. In contexts where students lacked digital access, educational continuity was disrupted, which, in turn, reinforced pre-existing inequalities and limited social mobility.

Socio-cultural factors further compound the challenges of digital equity. Veintie *et al*. (2022) [37] explore how intercultural bilingual education in Amazonia faced multiple crises during periods of technological scarcity, demonstrating that contextualized approaches, responsive curricula, and community engagement are essential in bridging the digital gap. Similarly, qualitative studies by Bayne (2024) [6] and Amadu (2024) [4] reveal that students' digital engagement is mediated by socio-cultural capital, including prior exposure to technology, parental involvement, and institutional support systems. These findings suggest that digital inclusion strategies must address not only infrastructure but also social and pedagogical dimensions of learning.

Digital literacy, as distinct from access, emerges as a critical factor in educational equity. Harutyunyan *et al*. (2024) [15] and Ewuoso (2025) [13] emphasize that digital skills encompass the ability to search, evaluate, and apply information effectively, requiring targeted interventions for students, teachers, and communities. Without such competencies, access alone cannot translate into meaningful learning outcomes, and marginalized groups may remain excluded from the transformative potential of digital education. Therefore, interventions aimed at bridging the digital divide must incorporate capacity-building initiatives alongside hardware provision, ensuring learners can fully benefit from technology-mediated instruction.

The integration of artificial intelligence (AI) and emerging technologies into education introduces both opportunities and challenges in addressing digital inequities. Kyambade *et al*. (2025) [22] illustrate that AI-guided and learner-

personalized paradigms have the potential to tailor learning experiences to individual needs, offering differentiated instruction that can enhance equity. However, the adoption of such advanced technologies is uneven, and access often favors well-resourced institutions and learners, potentially widening the digital divide if systemic support mechanisms are not implemented (Wessel *et al*., 2025 [38]; Alam & Mohanty, 2023) [1]. This underscores the importance of conceptual frameworks that account for technological sophistication, educator competence, and institutional readiness in promoting inclusive education.

The role of educators as mediators of digital inclusion is particularly salient. Brugha and Hennessy (2022) [8] highlight how local facilitators in Massive Open Online Courses (MOOCs) contributed to educational dialogue and knowledge co-creation, demonstrating that teacher agency can significantly influence learning outcomes in digital environments. Similarly, Bearman *et al*. (2023) [7] argue for designing assessment frameworks that reflect the affordances of digital learning, ensuring that evaluation mechanisms are equitable, valid, and responsive to students' diverse digital competencies. These studies reinforce the notion that bridging the digital divide requires both infrastructural provision and pedagogical innovation.

Parental and community involvement has emerged as a critical factor in shaping digital learning experiences, particularly in home-based or low-resource contexts. Qualter (2024) [32] emphasizes the role of parental engagement in facilitating home-based digital learning, noting that digital exclusion often stems from a lack of supportive environments rather than individual deficiencies alone. McCosker and Tucker (2025) [27] similarly note that collective capabilities, such as shared community knowledge, resource pooling, and informal networks, can mitigate some effects of digital inequity, highlighting the social dimension of technology-mediated learning.

Global perspectives on educational equity reveal that structural policies and institutional strategies are pivotal in mitigating digital disparities. Metsämuuronen and Lehikko (2023) [28] discuss post-COVID-19 challenges in Nordic countries, illustrating that policy interventions, teacher training, and resource allocation can enhance both equity and equality in digital education. Rodgers (2022) [33] and Campbell (2021) [9] further note that embedding equity considerations into the design and implementation of digital courseware is essential for ensuring that technology adoption does not inadvertently reinforce existing social hierarchies. Likewise, Lehtinen *et al*. (2023) [24] describe how librarians in Finland acted as facilitators to bridge the digital divide, demonstrating that institutional actors can play a critical role in enabling equitable access to information resources.

Several conceptual frameworks have been proposed to guide the integration of technology into education while promoting equity. Alam and Mohanty (2024) [2] present a model that emphasizes the convergence of technology, pedagogy, and interactivity, highlighting the role of AI and adaptive learning tools in creating transformative educational experiences. Owolabi (2021) [31] introduces the ASIC framework for integrating educational technologies into medical sciences, emphasizing structured planning, alignment, support, and continuous evaluation. These frameworks collectively suggest that achieving educational equity in the digital age requires a holistic approach that encompasses infrastructure, pedagogy, policy, and socio-cultural context.

The COVID-19 pandemic, as documented by Al-Sholi *et al*. (2021) [3] and Sing Yun (2023), served as a stress test for global education systems, revealing both the potential and the limitations of digital interventions. Students in digitally marginalized settings experienced interrupted learning, reduced engagement, and long-term skill gaps, while institutions that adopted agile, inclusive, and supportive digital strategies demonstrated greater resilience. This underscores the importance of systemic, context-sensitive approaches to bridging the digital divide, integrating technological access, digital literacy, pedagogical innovation, and community support.

The literature demonstrates that the digital divide is a complex, multi-dimensional phenomenon with profound implications for educational equity. Access to technology, digital literacy, educator competence, socio-cultural context, and institutional support collectively shape learners' ability to participate meaningfully in digital learning ecosystems. Conceptual frameworks that integrate these dimensions provide guidance for researchers, educators, and policymakers seeking to design inclusive educational systems. The evidence underscores that bridging the digital divide requires coordinated interventions addressing both structural inequities and pedagogical challenges, ensuring that digital technologies serve as tools for empowerment rather than mechanisms of exclusion.

**Research Methodology**

This study adopts a conceptual research design aimed at developing a comprehensive framework to understand the relationship between digital divide and educational equity. Given the theoretical nature of the study, the methodology emphasizes systematic synthesis and critical analysis of existing literature, rather than primary data collection. The study draws upon 39 peer-reviewed journal articles published between 2010 and 2025, spanning domains of digital literacy, educational technology, socio-economic determinants of learning, and digital inclusion strategies. Sources include empirical studies, systematic reviews, conceptual papers, and policy analyses to ensure a balanced and multi-dimensional perspective (Annoni *et al*., 2023 [5]; Durand *et al*., 2022 [11]; Wilson-Menzfeld *et al*., 2025) [39].

**Objectives of the Study**

- To analyze the relationship between the digital divide and educational equity through a comprehensive review of existing literature.
- To identify key factors—technological, pedagogical, and socio-cultural—that influence digital inclusion and equitable learning outcomes.
- To synthesize empirical and theoretical insights to construct a conceptual framework addressing digital inequities in education.
- To provide policy and practice-oriented recommendations for promoting inclusive and equitable digital learning environments.

The methodology involves three key stages. First, a comprehensive literature search was conducted using databases such as Scopus, Web of Science, and Google Scholar, using keywords including "digital divide," "educational equity," "digital literacy," "ICT in education,"

and "digital inclusion." Second, screening and selection of relevant studies were carried out based on criteria such as relevance to digital education, focus on equity or inclusion, methodological rigor, and recency of publication. Third, the selected studies were subjected to content analysis, categorizing findings into themes such as technological access, pedagogical practices, socio-cultural influences, policy frameworks, and emerging technologies (Kyambade *et al*., 2025 [22]; Hidayat & Chao, 2025) [17].

The study further identifies interlinkages between access, capability, and institutional support, which are critical for conceptualizing educational equity in the digital age. By synthesizing empirical evidence and theoretical insights, the methodology enables the construction of a conceptual framework that integrates technological, pedagogical, and socio-cultural dimensions of the digital divide. The framework provides a basis for guiding policymakers, educators, and researchers in designing interventions that reduce digital inequities and promote inclusive learning outcomes. This approach aligns with previous conceptual studies emphasizing the necessity of holistic, multi-dimensional analyses to understand complex socio-technical phenomena (Amadu, 2024 [4]; Veintie *et al*., 2022) [37].

## Discussion

The findings from the literature review and the conceptual synthesis highlight that the digital divide is a complex, multi-dimensional phenomenon, directly influencing educational equity. While access to digital devices and reliable internet remains foundational, studies emphasize that mere access does not guarantee meaningful participation or learning outcomes (Durand *et al*., 2022 [11]; McCosker & Tucker, 2025) [27]. Digital literacy, encompassing the ability to navigate, evaluate, and utilize digital tools effectively, emerges as a critical mediator, determining whether students and educators can transform technological resources into tangible educational benefits (Harutyunyan *et al*., 2024 [15]; Ewuoso, 2025) [13].

The discussion further underscores the interplay of socio-economic, cultural, and institutional factors. Low-income households and marginalized communities often face compounded disadvantages, where limited access intersects with insufficient digital skills and a lack of institutional support, exacerbating inequities (Amadu, 2024 [4]; Veintie *et al*., 2022) [37]. Teacher preparedness and professional development are equally crucial; the ability of educators to integrate technology effectively influences student engagement, learning outcomes, and resilience in the face of disruptions such as the COVID-19 pandemic (Hidayat & Chao, 2025 [17]; Eşki *et al*., 2025) [12]. This reinforces the notion that bridging the digital divide requires interventions beyond infrastructure provision, targeting capacity building and pedagogical innovation.

Emerging technologies, including AI and adaptive learning platforms, present both opportunities and risks. While they enable personalized learning and can potentially reduce disparities, uneven adoption risks widening the digital divide if access, skills, and institutional readiness are not addressed systematically (Kyambade *et al*., 2025 [22]; Wessel *et al*., 2025) [38]. Moreover, parental involvement, community engagement, and culturally responsive curricula are pivotal in enhancing digital inclusion, particularly in low-resource contexts (Qualter, 2024 [32]; Bayne, 2024) [6].

Overall, the conceptual framework developed in this study integrates these dimensions—technological access, digital literacy, pedagogical competence, socio-cultural factors, and institutional support—offering a holistic perspective on educational equity. By situating digital inclusion within structural, pedagogical, and societal contexts, this framework provides guidance for policymakers, educators, and researchers aiming to design inclusive strategies that ensure technology serves as a tool for empowerment rather than a mechanism of exclusion.

## Major Findings

### 1. Digital Access Alone Is Insufficient

Merely providing access to digital devices and internet connectivity does not ensure educational equity. Without digital literacy and pedagogical support, access remains superficial and does not translate into meaningful learning outcomes.

### 2. Digital Literacy as a Core Determinant

The ability to effectively use, evaluate, and create digital content is a key mediator between technological access and educational achievement. Students and teachers with higher digital competence experience greater academic engagement and confidence in online environments.

### 3. Socio-Economic and Geographical Disparities Persist

Students from low-income families and those in rural or remote areas continue to face barriers to connectivity and device ownership, deepening educational inequalities across social and regional lines.

### 4. Teacher Preparedness Influences Educational Outcomes

The integration of technology in classrooms depends largely on educators' digital skills and pedagogical adaptability. Teacher training and professional development are essential for bridging the digital divide in teaching practices.

### 5. Institutional and Policy Support Are Critical

Sustainable digital inclusion requires coherent institutional frameworks, investment in infrastructure, and policies that ensure equitable access, ongoing training, and digital resource availability for all learners.

### 6. Socio-Cultural Context Shapes Digital Inclusion

Cultural attitudes, language diversity, and parental involvement significantly influence how students engage with digital learning, particularly in multicultural and low-resource settings.

### 7. Emerging Technologies Offer Both Opportunities and Risks

Artificial intelligence and adaptive learning systems can personalize education and promote inclusivity, but unequal adoption and insufficient readiness may widen the divide further.

### 8. Community and Parental Engagement Enhance Equity

Active community participation and parental guidance support students' digital engagement, especially where institutional resources are limited.

### 9. A Holistic, Multi-Dimensional Framework Is Needed

Achieving educational equity in the digital era requires integrated strategies addressing technology access, digital skills, pedagogy, socio-economic factors, and institutional support simultaneously.

## Conclusion

The present study emphasizes that the digital divide is not merely a matter of unequal access to technology but a multifaceted phenomenon encompassing digital literacy, socio-economic disparities, institutional support, and pedagogical capacity. The literature reviewed demonstrates that inequities in digital access disproportionately affect marginalized communities, rural populations, and low-income households, limiting opportunities for meaningful engagement in education and constraining social mobility (Durand *et al*., 2022 [11]; McCosker & Tucker, 2025) [27]. Bridging this divide requires a comprehensive understanding of the interplay between technological availability, learner and educator competencies, socio-cultural factors, and institutional readiness.

The conceptual framework developed through this study integrates these dimensions, offering a holistic lens to examine how digital inequities influence educational outcomes. It highlights that effective interventions must extend beyond infrastructure provision to include capacity-building initiatives, teacher training, policy support, and culturally responsive pedagogy (Harutyunyan *et al*., 2024 [15]; Hidayat & Chao, 2025) [17]. Furthermore, parental involvement, community engagement, and context-specific strategies emerge as essential elements for fostering inclusive learning environments, particularly in low-resource or crisis-affected contexts (Qualter, 2024 [32]; Veintie *et al*., 2022) [37].

Emerging technologies, such as artificial intelligence and adaptive learning systems, provide opportunities to personalize learning and enhance engagement. However, unequal adoption and lack of preparedness may exacerbate existing disparities if equity considerations are not embedded into policy and practice (Kyambade *et al*., 2025 [22]; Wessel *et al*., 2025) [38]. Therefore, systemic, multi-level interventions are critical for ensuring that digital tools function as instruments of empowerment rather than sources of exclusion.

In conclusion, achieving educational equity in the digital era requires a coordinated approach that addresses technological, pedagogical, social, and institutional dimensions simultaneously. The proposed framework serves as a guide for policymakers, educators, and researchers to design evidence-based interventions that reduce the digital divide, foster digital literacy, and promote equitable access to learning opportunities. Future research can empirically validate this framework, explore cross-cultural applicability, and examine the impact of emerging technologies on inclusivity and learner outcomes across diverse educational contexts.

## References


1. Alam A, Mohanty A. Educational technology: Exploring the convergence of technology and pedagogy through mobility, interactivity, AI, and learning tools. Cogent Engineering,2023:10(2):2283282.
2. Alam A, Mohanty A. Integrated constructive robotics in education (ICRE) model: a paradigmatic framework for transformative learning in educational ecosystem. Cogent Education,2024:11(1):2324487.
3. Al-Sholi HY, Shadid OR, Alshare KA, Lane M. An agile educational framework: A response for the covid-19 pandemic. Cogent Education,2021:8(1):1980939.
4. Amadu MF. Digital divide or digital opportunities: interrogating online news consumption pattern of Ghanaian tertiary students. Cogent Social Sciences,2024:10(1):2424987.
5. Annoni A, Nativi S, Çöltekin A, Desha C, Eremchenko E, Gevaert CM, *et al*. Digital earth: yesterday, today, and tomorrow. International Journal of Digital Earth,2023:16(1):1022–1072.
6. Bayne S. Digital education utopia. Learning, Media and Technology,2024:49(3):506–521.
7. Bearman M, Nieminen JH, Ajjawi R. Designing assessment in a digital world: an organising framework. Assessment Evaluation in Higher Education,2023:48(3):291–304.
8. Brugha ME, Hennessy S. Educators as creators: lessons from a mechanical MOOC on educational dialogue for local facilitators. Irish Educational Studies,2022:41(1):225–243.
9. Campbell C. Educational equity in Canada: the case of Ontario's strategies and actions to advance excellence and equity for students. School Leadership Management,2021:41(4-5):409–428.
10. Dowrick C, Kassai R, Lam CLK, Lam RW, Manning G, Murphy J, *et al*. The APEC Digital Hub-WONCA Collaborative Framework on Integration of Mental Health into Primary Care in the Asia Pacific. Journal of Multidisciplinary Healthcare,2020:13(null):1693–1704.
11. Durand A, Zijlstra T, van Oort N, Hoogendoorn-Lanser S, Hoogendoorn S. Access denied? Digital inequality in transport services. Transport Reviews,2022:42(1):32–57.
12. Eşki M, Sanchez HS, Walsh S. Navigating digital teaching in Spain during the COVID-19 pandemic: how language teacher educators enhance and integrate digital literacy and resilience. Cogent Education,2025:12(1):2518812.
13. Ewuoso C. 'What is the harm of the digital divide that must be the object of digital inclusion work and strategies? A systematic review.' Cogent Social Sciences,2025:11(1):2527965.
14. Foley RW, Sylvain O, Foster S. Innovation and equality: an approach to constructing a community governed network common. Journal of Responsible Innovation,2022:9(1):49–73.
15. Harutyunyan G, Manucharyan M, Muradyan M, Asatryan H. Digital literacy of the Armenian society: assessment and determinants. Cogent Social Sciences,2024:10(1):2398652.
16. Hernández-Martínez M, Posso-Yépez M, Cadena-Povea H, Rivadeneira-Flores J, Placencia-Enríquez F. ICT for the development of mathematical competencies in secondary education: a systematic review. Cogent Education,2025:12(1):2511038.
17. Hidayat A, Chao T. Unleashing mathematics teachers: insights from a systematic literature review on digital learning in Indonesia. Cogent Education,2025:12(1):2442868.

18. Horvath K, Steinberg M. Social classification and the changing boundaries of learning. A neopragmatic perspective on social sorting in digital education. Learning, Media and Technology,2023:48(4):566–580.
19. Ji L, Jiang W, Deng B. Corporate digital transformation and cost of equity capital. China Journal of Accounting Studies,2024:12(4):693–721.
20. Kahne J, Hodgin E, Eidman-Aadahl E. Redesigning Civic Education for the Digital Age: Participatory Politics and the Pursuit of Democratic Engagement. Theory Research in Social Education,2016:44(1):1–35.
21. Karatsiori M. In the pursuit of "Quality Education": From ancient times to the digital era, can there be a consensus? Cogent Education,2023:10(2):2286817.
22. Kyambade M, Namatovu A, Male Ssentumbwe A. Exploring the evolution of artificial intelligence in education: from AI-guided learning to learner-personalized paradigms. Cogent Education,2025:12(1):2505297.
23. Lapaige V. "Integrated knowledge translation" for globally oriented public health practitioners and scientists: Framing together a sustainable transfrontier knowledge translation vision. Journal of Multidisciplinary Healthcare,2010:3(null):33–47.
24. Lehtinen E, Poutanen S, Kovalainen A. Librarians bridging the digital divide: Experiences from Finland. Journal of Access Services,2023:20(3-4):120–140.
25. Maniriho A. Satisfaction and academic performance of undergraduate economics students. Cogent Education,2024:11(1):2326707.
26. Mathrani A, Sarvesh T, Umer R. Digital divide framework: online learning in developing countries during the COVID-19 lockdown. Globalisation, Societies and Education,2022:20(5):625–640.
27. McCosker A, Tucker J. Bootstrapping the digital divide: a situational analysis of digital demands and collective capabilities in low-income households. Information, Communication Society,2025:28(1):105–123.
28. Metsämuuronen J, Lehikko A. Challenges and Possibilities of Educational Equity and Equality in the Post-COVID-19 Realm in the Nordic Countries. Scandinavian Journal of Educational Research,2023:67(7):1100–1121.
29. Nearing KA, Dryden EM, Pimentel CB, Kernan LM, Hartz S, Kelley L, *et al*. Can telemedicine reach rural, older veterans on the edge of or caught in the digital divide? – Unique considerations for two distinct populations. Cogent Gerontology,2024:3(1):2336899.
30. Nik E, Gauci R, Ross B, Tedeschi J. Exploring the potential of digital storytelling in a widening participation context. Educational Research,2024:66(3):329–346.
31. Owolabi J. Proposing a Framework Guide for the Integration of Educational Technologies and Innovations into the Teaching of Anatomy and Medical Sciences: The ASIC Framework. Advances in Medical Education and Practice,2021:12(null):1277–1282.
32. Qualter D. From Digital Exclusion to Digital Inclusion: Shaping the Role of Parental Involvement in Home-Based Digital Learning – A Narrative Literature Review. Computers in the Schools,2024:41(2):120–144.
33. Rodgers AJ. Embedding Equity in the Design and Implementation of Digital Courseware. Change: The Magazine of Higher Learning,2022:54(4):18–22.
34. Scholes L. Reading for digital futures: a lens to consider social justice issues in student literacy experiences in the digital age. Cambridge Journal of Education,2024:54(1):71–88.
35. Sebele-Mpofu FY. Hidden curriculum in accounting education in the digital era: the evolution, role, controversies, challenges and implications. Cogent Arts Humanities,2024:11(1):2402123.
36. Sing Yun W. Digitalization challenges in education during COVID-19: A systematic review. Cogent Education,2023:10(1):2198981.
37. Veintie T, Hohenthal J, Betancourt Machoa K, Sirén A. The (im) possibilities of education in Amazonia: assessing the resilience of intercultural bilingual education in the midst of multiple crises. Diaspora, Indigenous, and Minority Education,2022:16(4):259–272.
38. Wessel M, Adam M, Benlian A, Majchrzak A, Thies F. Generative AI and its Transformative Value for Digital Platforms. Journal of Management Information Systems,2025:42(2):346–369.
39. Wilson-Menzfeld G, Erfani G, Young-Murphy L, Charlton W, de Luca H, Brittain K, *et al*. Identifying and understanding digital exclusion: a mixed-methods study. Behaviour Information Technology,2025:44(8):1649–1666.