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DIGITAL CULTURE AND EDUCATION: THE ROLE OF TECHNOLOGY IN SHAPING LEARNING, IDENTITY, AND SOCIAL INTERACTION

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ABSTRACT

Digital technologies have been embedded in the life of learning, shaping access, participation, construction of identity, and relationships within educational spaces. This review explored the relationship between digital culture and learning, identity and social interaction in current learning environments. The integrative literature review approach was followed using peer reviewed studies and authoritative report. Structured searches were conducted in Scopus, Web of Science, ERIC, PsycINFO to identify literature. The evidence was organised thematically across three interwoven strands: learning, identity, and social interaction, as well as digital inequality, literacy, privacy, wellbeing, ethics, algorithmic influence and AI. The review identified a number of positive outcomes for flexible learning, collaborative learning, learning about information and knowledge, self-expression, and social participation that can be gained from the use of digital technologies, as well as negative outcomes such as distraction, social comparison, isolation, unequal access, privacy and problematic technology use. These relationships have been further complicated by the emergence of generative AI, which alters authorship, learner independence, assessment methods, and interactions with educational content. The results point to an understanding of educational technology not just as an educational tool, but as a part of the larger cultural and social context in which learning occurs. Future studies should pay more attention to the long-term effects, cultural differences, digitally disadvantaged learners, and increasingly intelligent educational systems and their role in relation to human interaction.

KEYWORDS: Digital Culture; Digital Education; Educational Technology; Learning; Digital Identity; Social Interaction; Digital Literacy; Artificial Intelligence.

1. INTRODUCTION

Digital technology is now a part of today's education, not just the way knowledge is presented, but the ways in which learners communicate, interact in education, and live their lives. UNESCO (2023) argued that the importance of the technology in education was related to the context of access, governance and use of technology. Digital education has therefore evolved from being a single pedagogical device to an expanded system of technologies, institutions, policies and human capacities (OECD, 2023b). This shift has also fueled overarching conversations on the role and future of education in the new social and technological contexts (UNESCO, 2021).

Gaps in connectivity, device access, digital skills, and support have continued to be a major concern, as they can hinder meaningful engagement with technology-mediated education (UNICEF, 2021). At the institutional level, digital transformation has included not only an adoption of technology, but a change to strategy, teaching, services, and organizational practices (Castro Benavides et al., 2020). The technology solutionism has as a result raised concerns, especially in the context of the products emerging as simple solutions to complex educational issues (Teräs et al., 2020).

COVID-19 further pushed these changes and brought digital learning to the core of the learning experience. There has been evidence from multiple countries that online/blended learning will continue to have an impact on higher education beyond the emergency situation (Guppy et al., 2022). Digitalization also affected the daily life of school education and family life (Iivari et al., 2020). Concurrently, the challenges of access, interaction, pedagogical readiness and technological infrastructure were highlighted in the context of emergency online teaching (Ferri et al., 2020). Students felt that digital education went beyond learning outcomes and impacted their communication, social relations and wellbeing (Aristovnik et al., 2020).

Previous studies have tended to analyse learning, digital identity and technology mediated social interaction in isolation. This review thus compiled these dynamic strands to explore the impact of digital culture on learning practices, learner identity and self-expression, social relations and participation, as well as opportunities and challenges that appeared in each of these interrelated aspects. The questions under review were: How digital technology has transformed learning practices and experiences; How digital learning environments have affected learners' identity and self-expression; How digital technology has changed social interaction and participation; and What were the common opportunities and challenges that arose in these interrelated aspects?

2. METHODOLOGY

2.1. Review Design

A literature review that employed an integrative approach was conducted to explore the impact of digital technologies on learning, identity and social interaction within education. This allowed quantitative, qualitative, mixed methods and conceptual studies to be accommodated across disciplines. To find recurring patterns, contrasting findings and relations between the three central dimensions of digital culture a structured search was used in conjunction with interpretive synthesis.

2.2. Literature Search Strategy

Structured searches were performed in the databases Scopus, Web of Science, ERIC and PsycINFO, and Google Scholar was used to supplement the searches. The terms used in the search were related to learning, identity, belonging, interaction, collaboration, communication, and social presence, plus the terms "digital culture," "digital technology," "digital education," "social media," "artificial intelligence," and "digital platforms."

2.3. Eligibility And Study Selection

English-language studies were included when they examined digital technology in education in relation to learning, identity, or social interaction. Studies that included quantitative, qualitative, mixed-methods, conceptual and other relevant authoritative studies were taken into consideration. Technical, software and non-educational studies were not included. Using the pre-established inclusion/exclusion criteria, potentially relevant records were placed in the screening and abstracted and then assessed for full text if necessary.

2.4. Data Extraction and Thematic Synthesis

Extraction of data was done based on publication year, geographical context, participants, educational setting, technology, study design, and key findings. Themes were developed from the synthesis of the evidence with the themes of learning, identity, and social interaction. To support an integrated interpretation of the literature, cross-cutting issues, such as digital inequality, literacy, privacy, wellbeing, ethics, algorithmic influence and artificial intelligence were then examined. The framework employed to structure the evidence reviewed is outlined in Table 1.

Table 1: Analytical Framework Used for the Integrative Review.

Review domain	Main issues examined	Illustrative concepts
Learning	Changes in access, participation, engagement, and knowledge practices	Flexible learning, self-regulation, collaboration, blended learning, AI-assisted learning
Identity	Ways digital environments shape self-understanding and representation	Digital identity, self-presentation, digital footprints, autonomy, professional identity
Social interaction	Changes in communication, belonging, relationships, and participation	Social presence, peer interaction, connectedness, loneliness, collaborative learning
Cross-cutting dimensions	Conditions influencing all three domains	Digital inequality, digital literacy, privacy, wellbeing, ethics, algorithms, artificial intelligence

3. DIGITAL CULTURE AS A CHANGING EDUCATIONAL ENVIRONMENT

Digital culture has transformed the understanding, organization and experience of education. Today, technology is integrated into the information, communication, collaboration and knowledge construction environment for learners. This transformation has changed the importance of digital competence.The importance of digital competence has grown. Spante et al. (2018) reported that the concepts of digital literacy and digital competence are used in a wide variety of contexts in the study of higher education, and Law et al. (2018) defined digital literacy as the capacity to access, manage, assess, produce, and share information using digital technologies.

In addition, the changing environment has brought with it more expectations on teachers. Pedagogical judgment, ethical consciousness, communicative competence, and informed technology choice have been needed in digital teaching, rather than technical skills. This was captured by falloon (2020) who developed a teacher digital competency framework which is linked to technological, pedagogical and professional capabilities. Beyond technical skills, questions of responsibility, citizenship and rights have been on the agenda of digital participation (Pangrazio & Sefton-Green, 2021).

The arrival of digital culture has added to the ambiguity of the formal/informal learning dichotomy. Learners now traverse institutional platforms, social media, search engines, mobile applications, and online communities. This broader picture was reflected in integrated components of the DigComp 2.2 framework like information literacy, communication, content creation, safety, and problem solving (Vuorikari et al., 2022). Successful integration has relied on the way technologies have been incorporated into the curriculum and in teaching (Fernández-Sánchez et al., 2022).

This has been strengthened by policy frameworks. The European Commission (2020) considered digital transformation a priority for education in the long term, and the OECD (2021a) stressed the need for critical navigation of digital information. Emerging technologies have also had an impact on educational systems and decision making (OECD, 2021b). UNESCO (2019) emphasized that in the field of education, AI should be human-centered, inclusive and ethically regulated. Combined, these changes set the stage for the emergence of digital culture as the overarching context for learning practices, identities and social relations to be increasingly constructed. Conceptually this relationship is shown in Figure 1.

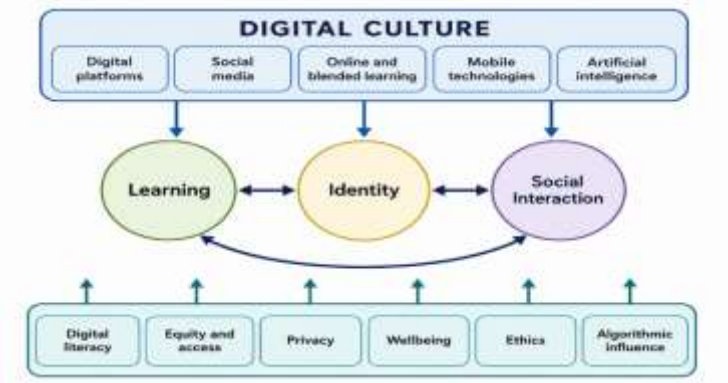

Figure 1: Conceptual Representation of Digital Culture as an Educational Environment Shaping Learning, Identity, And Social Interaction.

4. TECHNOLOGY AND THE TRANSFORMATION OF LEARNING

Digital technologies have transformed learning by providing access to knowledge, flexible participation and new means of interaction with knowledge. In the context of higher education, technology has been closely linked with student engagement, but its impact has been inconsistent depending on context and technology (Bond et al., 2020). The use of e-learning and blended learning, together with the pedagogical and institutional support, has also yielded positive results in place of classroom teaching or to complement classroom teaching, and not as a mere alternative (Galvis & Carvajal, 2022).

Digital platforms, mobile apps, online videos and social media have opened up learning outside of the classroom, fostering more flexible and student-directed learning (Haleem et al., 2022). However, self-regulation, interaction, and social presence (Miao & Ma, 2022) have been the three key factors for successful online learning. Social media has also helped to facilitate the collaborative learning of students by allowing them to share their ideas and resources outside of the classroom (Ansari & Khan, 2020), and has affected how students use social media as a tool to engage in learning in different ways (Abbas et al., 2019). Online learning has been flexible, as well as having significant issues with concentration, interaction, access and instructional quality during the pandemic (Coman et al., 2020).

Artificial intelligence has introduced another major shift. There's been potential for the use of ChatGPT as a tutor, to provide feedback, and to offer personalized support — and it has also introduced concerns about academic integrity and dependence (Lo, 2023). The same concerns have been raised regarding generative AI (Grassini, 2023) and its cognitive and ethical implications. These tools can contribute to educational reform but have limitations of effectiveness, responsible use, and evolving teacher roles (Yu & Guo, 2023).

5. DIGITAL TECHNOLOGY, IDENTITY, AND THE LEARNER

Digital environments have come to be vital areas in which learners construct, contest and reconstruct identity. Social media can provide an important setting for identity exploration and self-definition during adolescence, as young people interact with others, present themselves, and receive feedback in digital environments (Pérez-Torres, 2024). Meanwhile, online settings can be extremely competitive, leading to self-optimization and a desire to create a self-presentation that is idealized (Butler, 2024). Developmental stage, family, culture, and social conditions, particularly in lower and middle-income communities, also influence these processes (Magis-Weinberg et al., 2021).

The formation of identity in digital environment is closely related to wellbeing and social comparison. Social media has been found to have positive and negative relationships with adolescent mental health, depending on the usage pattern and context in which it is used (Schønning et al., 2020). Another self-determination (SDT) lens indicates that digital participation may have implications for the need for autonomy, competence, and relatedness (West et al., 2024). Self-presentation behaviors can also influence the self-evaluation and quality of life of the person (Skogen et al., 2021).

Digital identity is not limited to social media profiles in the educational context. Considering the fact that students are leaving behind digital footprints that can affect their reputation, privacy and future opportunities, it is more important than ever to be aware of them (Sürmelioğlu & Seferoğlu, 2019). Higher education may also be more purposeful in supporting learners to create their digital identities in a professional and academic context (Borrás-Gené, 2022). Cultural context is important, too. Research with university students in Bolivia has shown that young people negotiate cultural identity across social media platforms by adapting their self-presentation to different audiences, social expectations, and platform possibilities (Condemayta Soto et al., 2023). Digital identity presents then opportunities to express and to participate, but also new pressures to be visible, compared and judged socially.

6. TECHNOLOGY AND CHANGING PATTERNS OF SOCIAL INTERACTION

Digital technologies have transformed social interaction in education by altering how a student communicates, collaborates, and feels connected to others. In online, hybrid and blended learning environments, social presence has become a key factor in determining a learner's sense of accessibility, responsiveness and meaningful involvement in learning (Kreijns et al., 2024). However, introducing the live virtual classroom provides more real-time interactions and feedback opportunities that can enhance this sense of being (Aldosari et al., 2022). Where students may feel further removed from academic communities, positive online interactions with teachers can enhance a sense of belonging and engagement

(Thacker et al., 2022).

Peer relationships have also changed in digitally mediated environments. However, in addition to technological access to communication tools, successful online collaboration is also dependent on the social conditions that facilitate the regulation of interactions, participation and trust (Vrieling-Teunter et al., 2022). Positive social interactions may also reinforce engagement and connection, motivating ongoing learning, which can benefit from online social interactions (Zhang et al., 2023).

Meanwhile, digital education may deepen the feelings of isolation when interactions are insufficient. Online students with disabilities have experienced feelings of isolation associated with fewer opportunities for informal contact and social engagement (Kotera et al., 2021). Student loneliness was also found to be affected by disrupted routines, limited in-person interaction, and a change in learning environments during the pandemic (Phillips et al., 2022). Loneliness has also been found to be a concern for college students with disabilities, including with online learning experiences and student outcomes (Bevens et al., 2024). The less time spent in school the more time spent at home, and this has been associated with learning difficulties in the time spent at home (Pavin Ivanec 2022). Social presence is thus an important factor in the creation of digital education, which promotes learning and human interactions (Grech, 2022).

7. CONNECTING LEARNING, IDENTITY, AND SOCIAL INTERACTION

Digital education is not an education that is divided into learning, identity, and social interaction, but one in which they are deeply intertwined. Access influences participation, as disparities in infrastructure, skills and support can restrict access for some to the benefits of digital learning environments (OECD, 2023a). The emergence of artificial intelligence has introduced another dimension to these relationships: how AI is used to communicate with learners, how learners use AI to make decisions, and how learners interact with educational systems, all of which has raised the need for human-centred and equitable policy approaches (Miao et al., 2021). The use of Generative AI has also sparked discussions around learner autonomy, authorship, privacy, and responsible use in education (Miao & Holmes, 2023).

These technologies can support cognitive and emotional needs, yet current evidence also points to limitations in reliability, personalization, and meaningful human support (Ortega-Ochoa et al., 2024). Likewise, social sites have a dual nature. They can enhance collaborative learning and knowledge sharing (Khan et al., 2021) and facilitate teaching when learners find them helpful and suitable for learning tasks (Al-Rahmi et al., 2022). Social and motivational factors are also conditions for knowledge sharing in online environments, demonstrating that knowledge is always relational, even in digital mediated contexts (Wang & Lin, 2021).

The same environments can produce tensions. Strong associations between intensive/dysfunctional social media use and social support differences and life satisfaction scores (Boniel-Nissim & Alt, 2022), and cross-segment associations between problematic digital use and psychological distress overtime (Chang et al., 2022) have been reported. The design of the platform also influences the content of what learners view and how they interact, as demonstrated in the study of the viewing behavior of learners in social media-based classrooms based on data analysis (Su & Lai, 2021). Digital culture is then a relational and social environment in which learning practices, positioning oneself, participation, wellbeing and relationships are co-created in an ongoing process. Table 2 shows the main opportunities, tensions and crosscutting issues discussed across these fields.

Table 2: Integrated Synthesis of Digital Culture Across Learning, Identity, And Social Interaction.

Domain	Key opportunities	Key challenges	Cross-cutting implications
Learning	Flexible access, collaborative learning, self-directed learning, personalized support	Distraction, misinformation, dependence, uneven digital competence	Literacy, equity, pedagogy, AI governance
Identity	Self-expression, identity exploration, professional identity development	Social comparison, idealized self-presentation, privacy concerns, persistent digital footprints	Wellbeing, citizenship, cultural context, privacy
Social interaction	Peer connection, social presence, collaboration, academic belonging	Isolation, loneliness, reduced informal interaction, problematic platform use	Inclusion, accessibility, wellbeing, human connection
AI-mediated education	Personalized assistance, feedback, information support	Bias, inaccurate output, authorship concerns, overreliance	Agency, ethics, transparency, assessment, digital literacy

8. DISCUSSION

The literature reviewed in this study revealed a growing trend of educational technology being used as a component of the social and cultural fabric of learning and education instead of an innocent tool for teaching. The effects were contingent upon the use of digital environments, the enabling or inhibiting role of institutions to participate and the interplay between motivation, well-being and social experience and technology. Students frequently experienced a need to learn new ways to regulate themselves, especially in their planning, concentration and study habits (Biwer et al., 2021). Social media was also part of students' academic practices, as students identified the advantages of communication, sharing resources and receiving informal support, as well as the disadvantages of distractions and permeable boundaries between school and home life (Fuchs, 2022). Relationships that arise from the evidence reviewed are synthesized in Figure 2.

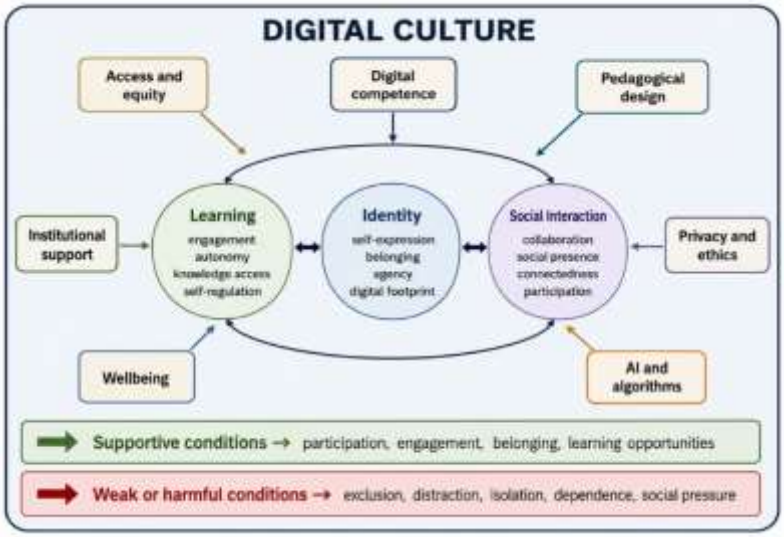

Figure 2: Integrative Model of the Relationships Among Learning, Identity, And Social Interaction Within Digital Educational Culture.

The evidence was therefore not uniformly positive. The potential for digital connectivity to enable communication and participation also revealed differences in mental health across national contexts in relation to intensive platform use (Thygesen et al., 2022). Problematic social media use was further linked with anxiety, with academic burnout and psychological resources influencing this relationship (Jiang, 2021). The results indicate that having more opportunities for access to digital environments does not necessarily lead to better education experiences. The competence of information seeking, utilizing essential technologies, and adapting to disruptions seemed to make a more significant contribution to learning outcomes than access (Miraj et al., 2021).

Several studies nevertheless showed that technology could strengthen learning when social and pedagogical conditions were supportive. When interaction, digital literacy and collaborative learning are properly integrated, the use of social media has been linked to the students' performance and satisfaction in higher education (Al-Rahmi et al., 2022). In personal narratives too, the students and teachers were shown how they can access social platforms to enrich teaching and learning beyond the walls of the classroom (Kara et al., 2020). The online learning platform also provided flexibility and convenience, but there were also some reported challenges regarding interactions, focus, technical issues, and hands-on learning in the online environment (Bączek et al., 2021). Similar issues were reported in contexts where internet availability was limited and interactions minimal, affecting the effectiveness of using online learning during an emergency (Adnan & Anwar, 2020).

The mixed results indicated a key message: Technology was not the primary factor that made educational quality. The instructional design, learner's readiness, social presence, institutional support, and context-sensitive implementation were major factors in effective digital education. The experience of the quick changes of the higher education system showed that structured teaching, clear communication and appropriate learning support have added value to the digital transition in the field of education (Bao, 2020). Therefore, in the future, the policy and practice should no longer be

based on technology adoption but on equitable access, digital competence, wellbeing, inclusive design and meaningful human interaction. There is still a need for additional research in areas that were not extensively studied during the pandemic and higher education that do not reflect the diversity of learners, such as younger students, marginalized groups, and newer technologies.

9. RESEARCH GAPS AND FUTURE DIRECTIONS

The rapid expansion of artificial intelligence has created new questions that current educational research has only begun to address. While the use of generative AI across higher education has garnered additional interest in personalization, feedback, assessment, and academic support, there is limited evidence for its long-term impact (Batista et al., 2024). The study on teaching and learning applications has also stressed the importance of robust empirical assessment, transcending the perceptions and initial adoption research that occurred in the short term (Ogunleye et al., 2024). A further study is therefore needed for the long-term impact of a continuous use of AI on learning behavior, learner autonomy, learner identity, and relationships.

Generative AI may reshape educational practices, yet its wider cultural consequences remain uncertain, particularly in relation to authorship, agency, and the role of human interaction in learning (Han, 2024). Assessment is another area which is far from settled and is continuing to change as institutions have reacted to generative AI in a variety of ways (Moorhouse et al., 2023). Student voices have shown interests and concerns, and have indicated that it is important to examine the ways in which trust, confidence, dependence and perceived fairness are formed in various education settings (Chan & Hu, 2023).

The evidence base is also not consistent. While AI research in higher education has expanded exponentially, there are distinct disparities between disciplines, institutions, and learners that have not been thoroughly studied consistently (Crompton & Burke, 2023). Wider evaluations have recommended enhancing the ethical focus, equity, transparency, and accountable execution (Chiu et al., 2023). The need to investigate teacher roles and institutional practice in the context of AI education was further confirmed by earlier research where teachers were underrepresented in AI related higher education research (Zawacki-Richter et al., 2019).

The study of AI literacy should also be explored in the context of digital citizenship and learner preparedness (Ng et al., 2021) in future research. Further cross-cultural, longitudinal and inclusive research is required to examine the impact of AI in education on digitally disadvantaged learners, social connectedness, privacy and online and offline identity. The social, cultural, and human impacts of AI use in education should be a focus of research as AI increasingly becomes a part of learning (Chen et al., 2020).

10. CONCLUSION

Digital culture has become a part and parcel of the twenty-first century's education, influencing the way that learner's access to knowledge, engage in learning, represent themselves, and connect with others. The case for technology's potential in learning, identity, and social interaction revealed that access and participation opportunities can be expanded, collaboration can be facilitated through the use of technology, there can be increased flexibility, and there can be new opportunities for participation, but these outcomes are not guaranteed. They rely on the digital competence, pedagogical design, institutional support, social presence and equitable access. Digital environments can also create pressures of distraction, comparison, isolation, privacy, problematic digital platform use and unequal digital inclusion. As artificial intelligence has become more prevalent, it has complicated matters even more for students in their information consumption, academic work, feedback, and authorship/responsibility. The changes indicate that the use of educational technology is not just about the technology used as a teaching tool, but the broader cultural and social context in which education happens. The future of education practice needs to therefore strike a balance between innovation and human connection, ethical protections, critical digital literacy and inclusive design. As digital technologies become more intricately involved in the fabric of daily learning, there will be an increasing need for a deeper understanding of how learning, identity, and social interaction are related.

REFERENCES

Abbas, J., Aman, J., Nurunnabi, M., & Bano, S. (2019). The impact of social media on learning behavior for sustainable education: Evidence of students from selected universities in Pakistan. Sustainability, 11(6), 1683. https://doi.org/10.3390/su11061683

Adnan, M., & Anwar, K. (2020). Online learning amid the COVID-19 pandemic: Students' perspectives. Journal of Pedagogical Sociology and Psychology, 2(1), 45–51. https://doi.org/10.33902/JPSP.2020261309

Aldosari, A. M., Alramthi, S. M., & Eid, H. F. (2022). Improving social presence in online higher education: Using live virtual classroom to confront learning challenges during COVID-19 pandemic. Frontiers in Psychology, 13, 994403. https://doi.org/10.3389/fpsyg.2022.994403

Al-Rahmi, A. M., Shamsuddin, A., Wahab, E., Al-Rahmi, W. M., Alturki, U., Aldraiweesh, A., & Almutairy, S. (2022). Integrating the role of UTAUT and TTF model to evaluate social media use for teaching and learning in higher education. Frontiers in Public Health, 10, 905968. https://doi.org/10.3389/fpubh.2022.905968

Al-Rahmi, A. M., Shamsuddin, A., Wahab, E., Al-Rahmi, W. M., Alyoussef, I. Y., & Crawford, J. (2022). Social media use in higher education: Building a structural equation model for student satisfaction and performance. Frontiers in Public Health, 10, 1003007. https://doi.org/10.3389/fpubh.2022.1003007

Ansari, J. A. N., & Khan, N. A. (2020). Exploring the role of social media in collaborative learning the new domain of learning. Smart Learning Environments, 7, 9. https://doi.org/10.1186/s40561-020-00118-7

Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020). Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. Sustainability, 12(20), 8438. https://doi.org/10.3390/su12208438

Bączek, M., Zagańczyk-Bączek, M., Szpringer, M., Jaroszyński, A., & Wożakowska-Kapłon, B. (2021). Students' perception of online learning during the COVID-19 pandemic: A survey study of Polish medical students. Medicine, 100(7), e24821. https://doi.org/10.1097/MD.0000000000024821

Bao, W. (2020). COVID-19 and online teaching in higher education: A case study of Peking University. Human Behavior and Emerging Technologies, 2(2), 113–115. https://doi.org/10.1002/hbe2.191

Batista, J., Mesquita, A., & Carnaz, G. (2024). Generative AI and higher education: Trends, challenges, and future directions from a systematic literature review. Information, 15(11), 676. https://doi.org/10.3390/info15110676

Bevens, W., Stoeckl, S. E., Schueller, S. M., Kim, J., Cha, B. S., Chwa, C., Stadnick, B. A., Best, N. C., & Sorkin, D. H. (2024). Loneliness, online learning and student outcomes in college students living with disabilities: Results from the National College Health Assessment Spring 2022. Frontiers in Psychology, 15, 1408837. https://doi.org/10.3389/fpsyg.2024.1408837

Biwer, F., Wiradhany, W., oude Egbrink, M., Hospers, H., Wasenitz, S., Jansen, W., & de Bruin, A. (2021). Changes and adaptations: How university students self-regulate their online learning during the COVID-19 pandemic. Frontiers in Psychology, 12, 642593. https://doi.org/10.3389/fpsyg.2021.642593

Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., & Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: A systematic evidence map. International Journal of Educational Technology in Higher Education, 17, 2. https://doi.org/10.1186/s41239-019-0176-8

Boniel-Nissim, M., & Alt, D. (2022). Problematic social media use and intensive social media use among academic students during the COVID-19 pandemic: Associations with social support and life satisfaction. Frontiers in Education, 7, 876774. https://doi.org/10.3389/feduc.2022.876774

Borrás-Gené, O. (2022). Professional and academic digital identity workshop for higher education students. Information, 13(10), 490. https://doi.org/10.3390/info13100490

Butler, S. (2024). Young people on social media in a globalized world: Self-optimization in highly competitive and achievement-oriented forms of life. Frontiers in Psychology, 15, 1340605. https://doi.org/10.3389/fpsyg.2024.1340605

Castro Benavides, L. M., Tamayo Arias, J. A., Arango Serna, M. D., Branch Bedoya, J. W., & Burgos, D. (2020). Digital transformation in higher education institutions: A systematic literature review.

Sensors, 20(11), 3291. https://doi.org/10.3390/s20113291
Chan, C. K. Y., & Hu, W. (2023). Students' voices on generative AI: Perceptions, benefits, and challenges in higher education. International Journal of Educational Technology in Higher Education, 20, 43. https://doi.org/10.1186/s41239-023-00411-8
Chang, C.-W., Huang, R.-Y., Strong, C., Lin, Y.-C., Tsai, M.-C., Chen, I.-H., Lin, C.-Y., Pakpour, A. H., & Griffiths, M. D. (2022). Reciprocal relationships between problematic social media use, problematic gaming, and psychological distress among university students: A 9-month longitudinal study. Frontiers in Public Health, 10, 858482. https://doi.org/10.3389/fpubh.2022.858482
Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. IEEE Access, 8, 75264–75278. https://doi.org/10.1109/ACCESS.2020.2988510
Chiu, T. K. F., Xia, Q., Zhou, X., Chai, C. S., & Cheng, M. (2023). Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education. Computers and Education: Artificial Intelligence, 4, 100118. https://doi.org/10.1016/j.caeai.2022.100118
Coman, C., Ţîru, L. G., Meseşan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective. Sustainability, 12(24), 10367. https://doi.org/10.3390/su122410367
Condemayta Soto, P., Bauwens, J., & Smets, K. (2023). Cultural identity performances on social media: A study of Bolivian students. Journalism and Media, 4(1), 304–321. https://doi.org/10.3390/journalmedia4010021
Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. International Journal of Educational Technology in Higher Education, 20, 22. https://doi.org/10.1186/s41239-023-00392-8
European Commission. (2020). Digital Education Action Plan 2021–2027: Resetting education and training for the digital age. European Commission.
Falloon, G. (2020). From digital literacy to digital competence: The teacher digital competency (TDC) framework. Educational Technology Research and Development, 68(5), 2449–2472. https://doi.org/10.1007/s11423-020-09767-4
Fernández-Sánchez, M. R., Garrido-Arroyo, M. C., & Porras-Masero, I. (2022). Curricular integration of digital technologies in teaching processes. Frontiers in Education, 7, 1005499. https://doi.org/10.3389/feduc.2022.1005499
Ferri, F., Grifoni, P., & Guzzo, T. (2020). Online learning and emergency remote teaching: Opportunities and challenges in emergency situations. Societies, 10(4), 86. https://doi.org/10.3390/soc10040086
Fuchs, K. (2022). An exploratory interview study about student perceptions of using social media to facilitate their undergraduate studies. Frontiers in Education, 7, 834391. https://doi.org/10.3389/feduc.2022.834391
Galvis, Á. H., & Carvajal, D. (2022). Learning from success stories when using eLearning and bLearning modalities in higher education: A meta-analysis and lessons towards digital educational transformation. International Journal of Educational Technology in Higher Education, 19, 23. https://doi.org/10.1186/s41239-022-00325-x
Grassini, S. (2023). Shaping the future of education: Exploring the potential and consequences of AI and ChatGPT in educational settings. Education Sciences, 13(7), 692. https://doi.org/10.3390/educsci13070692
Grech, J. (2022). Exploring nursing students' need for social presence and its relevance to their learning preferences. Nursing Open, 9(3), 1643–1652. https://doi.org/10.1002/nop2.1189
Guppy, N., Verpoorten, D., Boud, D., Lin, L., Tai, J., & Bartolic, S. (2022). The post-COVID-19 future of digital learning in higher education: Views from educators, students, and other professionals in six countries. British Journal of Educational Technology, 53(6), 1750–1765. https://doi.org/10.1111/bjet.13212
Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. Sustainable Operations and Computers, 3, 275–285. https://doi.org/10.1016/j.susoc.2022.05.004
Han, Y. (2024). Commentary: Generative artificial intelligence empowers educational reform: Current status, issues, and prospects. Frontiers in Education, 9, 1445169.

https://doi.org/10.3389/feduc.2024.1445169
Iivari, N., Sharma, S., & Ventä-Olkkonen, L. (2020). Digital transformation of everyday life—How COVID-19 pandemic transformed the basic education of the young generation and why information management research should care? International Journal of Information Management, 55, 102183. https://doi.org/10.1016/j.ijinfomgt.2020.102183
Jiang, Y. (2021). Problematic social media usage and anxiety among university students during the COVID-19 pandemic: The mediating role of psychological capital and the moderating role of academic burnout. Frontiers in Psychology, 12, 612007. https://doi.org/10.3389/fpsyg.2021.612007
Kara, N., Çubukçuoğlu, B., & Elçi, A. (2020). Using social media to support teaching and learning in higher education: An analysis of personal narratives. Research in Learning Technology, 28, 2410. https://doi.org/10.25304/rlt.v28.2410
Khan, M. N., Ashraf, M. A., Seinen, D., Khan, K. U., & Laar, R. A. (2021). Social media for knowledge acquisition and dissemination: The impact of the COVID-19 pandemic on collaborative learning driven social media adoption. Frontiers in Psychology, 12, 648253. https://doi.org/10.3389/fpsyg.2021.648253
Kotera, Y., Chircop, J., Hutchinson, L., Rhodes, C., Green, P., Jones, R.-M., Kaluzeviciute, G., & Garip, G. (2021). Loneliness in online students with disabilities: Qualitative investigation for experience, understanding and solutions. International Journal of Educational Technology in Higher Education, 18, 64. https://doi.org/10.1186/s41239-021-00301-x
Kreijns, K., Yau, J., Weidlich, J., & Weinberger, A. (2024). Towards a comprehensive framework of social presence for online, hybrid, and blended learning. Frontiers in Education, 8, 1286594. https://doi.org/10.3389/feduc.2023.1286594
Law, N., Woo, D., de la Torre, J., & Wong, G. (2018). A global framework of reference on digital literacy skills for indicator 4.4.2 (UIS Information Paper No. 51). UNESCO Institute for Statistics.
Lo, C. K. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. Education Sciences, 13(4), 410. https://doi.org/10.3390/educsci13040410
Magis-Weinberg, L., Ballonoff Suleiman, A., & Dahl, R. E. (2021). Context, development, and digital media: Implications for very young adolescents in LMICs. Frontiers in Psychology, 12, 632713. https://doi.org/10.3389/fpsyg.2021.632713
Miao, F., & Holmes, W. (2023). Guidance for generative AI in education and research. UNESCO. https://doi.org/10.54675/EWZM9535
Miao, F., Holmes, W., Huang, R., & Zhang, H. (2021). AI and education: Guidance for policy-makers. UNESCO. https://doi.org/10.54675/PCSP7350
Miao, J., & Ma, L. (2022). Students' online interaction, self-regulation, and learning engagement in higher education: The importance of social presence to online learning. Frontiers in Psychology, 13, 815220. https://doi.org/10.3389/fpsyg.2022.815220
Miraj, M., Chuntian, L., Mohd Said, R., Osei-Bonsu, R., & Rehman, R. (2021). How information-seeking behavior, essential technologies, and resilience enhance the academic performance of students. Frontiers in Psychology, 12, 651550. https://doi.org/10.3389/fpsyg.2021.651550
Moorhouse, B. L., Yeo, M. A., & Wan, Y. (2023). Generative AI tools and assessment: Guidelines of the world's top-ranking universities. Computers and Education Open, 5, 100151. https://doi.org/10.1016/j.caeo.2023.100151
Ng, D. T. K., Leung, J. K. L., Chu, S. K. W., & Qiao, M. S. (2021). Conceptualizing AI literacy: An exploratory review. Computers and Education: Artificial Intelligence, 2, 100041. https://doi.org/10.1016/j.caeai.2021.100041
OECD. (2021a). 21st-century readers: Developing literacy skills in a digital world. OECD Publishing. https://doi.org/10.1787/a83d84cb-en
OECD. (2021b). OECD digital education outlook 2021: Pushing the frontiers with artificial intelligence, blockchain and robots. OECD Publishing. https://doi.org/10.1787/589b283f-en
OECD. (2023a). Digital equity and inclusion in education: An overview of practice and policy in OECD countries. OECD Publishing.
OECD. (2023b). OECD digital education outlook 2023: Towards an effective digital education ecosystem. OECD Publishing. https://doi.org/10.1787/c74f03de-en

Ogunleye, B., Zakariyyah, K. I., Ajao, O., Olayinka, O., & Sharma, H. (2024). A systematic review of generative AI for teaching and learning practice. Education Sciences, 14(6), 636. https://doi.org/10.3390/educsci14060636

Ortega-Ochoa, E., Sabaté, J.-M., Arguedas, M., Conesa, J., Daradoumis, T., & Caballé, S. (2024). Exploring the utilization and deficiencies of generative artificial intelligence in students' cognitive and emotional needs: A systematic mini-review. Frontiers in Artificial Intelligence, 7, 1493566. https://doi.org/10.3389/frai.2024.1493566

Pangrazio, L., & Sefton-Green, J. (2021). Digital rights, digital citizenship and digital literacy: What's the difference? Journal of New Approaches in Educational Research, 10(1), 15–27. https://doi.org/10.7821/naer.2021.1.616

Pavin Ivanec, T. (2022). The lack of academic social interactions and students' learning difficulties during COVID-19 faculty lockdowns in Croatia: The mediating role of the perceived sense of life disruption caused by the pandemic and the adjustment to online studying. Social Sciences, 11(2), 42. https://doi.org/10.3390/socsci11020042

Pérez-Torres, V. (2024). Social media: A digital social mirror for identity development during adolescence. Current Psychology, 43, 22170–22180. https://doi.org/10.1007/s12144-024-05980-z

Phillips, R., Seaborne, K., Goldsmith, A., Curtis, N., Davies, A., Haynes, W., McEnroe, R., Murphy, N., O'Neill, L., Pacey, C., Walker, E., & Wordley, E. (2022). Student loneliness through the pandemic: How, why and where? The Geographical Journal, 188(2), 277–293. https://doi.org/10.1111/geoj.12438

Schønning, V., Hjetland, G. J., Aarø, L. E., & Skogen, J. C. (2020). Social media use and mental health and well-being among adolescents—A scoping review. Frontiers in Psychology, 11, 1949. https://doi.org/10.3389/fpsyg.2020.01949

Skogen, J. C., Hjetland, G. J., Bøe, T., Hella, R. T., & Knudsen, A. K. (2021). Through the looking glass of social media: Focus on self-presentation and association with mental health and quality of life. A cross-sectional survey-based study. International Journal of Environmental Research and Public Health, 18(6), 3319. https://doi.org/10.3390/ijerph18063319

Spante, M., Hashemi, S. S., Lundin, M., & Algers, A. (2018). Digital competence and digital literacy in higher education research: Systematic review of concept use. Cogent Education, 5(1), 1519143. https://doi.org/10.1080/2331186X.2018.1519143

Su, Y.-S., & Lai, C.-F. (2021). Applying educational data mining to explore viewing behaviors and performance with flipped classrooms on the social media platform Facebook. Frontiers in Psychology, 12, 653018. https://doi.org/10.3389/fpsyg.2021.653018

Sürmelioğlu, Y., & Seferoğlu, S. S. (2019). An examination of digital footprint awareness and digital experiences of higher education students. World Journal on Educational Technology: Current Issues, 11(1), 48–64. https://doi.org/10.18844/wjet.v11i1.4009

Teräs, M., Suoranta, J., Teräs, H., & Curcher, M. (2020). Post-Covid-19 education and education technology 'solutionism': A seller's market. Postdigital Science and Education, 2, 863–878. https://doi.org/10.1007/s42438-020-00164-x

Thacker, I., Seyranian, V., Madva, A., Duong, N. T., & Beardsley, P. (2022). Social connectedness in physical isolation: Online teaching practices that support under-represented undergraduate students' feelings of belonging and engagement in STEM. Education Sciences, 12(2), 61. https://doi.org/10.3390/educsci12020061

Thygesen, H., Bonsaksen, T., Schoultz, M., Ruffolo, M., Leung, J., Price, D., & Geirdal, A. Ø. (2022). Social media use and its associations with mental health 9 months after the COVID-19 outbreak: A cross-national study. Frontiers in Public Health, 9, 752004. https://doi.org/10.3389/fpubh.2021.752004

UNESCO. (2019). Beijing consensus on artificial intelligence and education. UNESCO.

UNESCO. (2021). Reimagining our futures together: A new social contract for education. UNESCO.

UNESCO. (2023). Global education monitoring report 2023: Technology in education—A tool on whose terms? UNESCO.

UNICEF. (2021). Digital learning for every child: Closing the gaps for an inclusive and prosperous future. UNICEF.

Vrieling-Teunter, E., Henderikx, M., Nadolski, R., & Kreijns, K. (2022). Facilitating peer interaction regulation in online settings: The role of social presence, social space and sociability. Frontiers in

Psychology, 13, 793798. https://doi.org/10.3389/fpsyg.2022.793798

Vuorikari, R., Kluzer, S., & Punie, Y. (2022). DigComp 2.2: The Digital Competence Framework for Citizens—with new examples of knowledge, skills and attitudes. Publications Office of the European Union. https://doi.org/10.2760/115376

Wang, W.-T., & Lin, Y.-L. (2021). Evaluating factors influencing knowledge-sharing behavior of students in online problem-based learning. Frontiers in Psychology, 12, 691755. https://doi.org/10.3389/fpsyg.2021.691755

West, M., Rice, S., & Vella-Brodrick, D. (2024). Adolescent social media use through a self-determination theory lens: A systematic scoping review. International Journal of Environmental Research and Public Health, 21(7), 862. https://doi.org/10.3390/ijerph21070862

Yu, H., & Guo, Y. (2023). Generative artificial intelligence empowers educational reform: Current status, issues, and prospects. Frontiers in Education, 8, 1183162. https://doi.org/10.3389/feduc.2023.1183162

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—Where are the educators? International Journal of Educational Technology in Higher Education, 16, 39. https://doi.org/10.1186/s41239-019-0171-0

Zhang, S., Che, S., Nan, D., & Kim, J. H. (2023). How does online social interaction promote students' continuous learning intentions? Frontiers in Psychology, 14, 1098110. https://doi.org/10.3389/fpsyg.2023.1098110