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Educational digital transformation: New technological challenges for competence development

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Editorial: Educational digital transformation: new technological challenges for competence development

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Editorial on the Research Topic

Educational digital transformation: new technological challenges for competence development

In recent years, the rapid advancement of technology has driven a paradigm shift in education, leading to the digital transformation of learning environments (Cabero-Almenara et al., 2022). Educational institutions worldwide have embraced this transformation, leveraging digital tools and platforms to enhance teaching and learning processes (Marimon-Martí et al., 2022; Vásquez Peñafiel et al., 2023). This editorial introduces contributions to the Research Topic "*Educational digital transformation: new technological challenges for competence development*", which seeks to improve training policies and practices to foster educational development.

The contributions presented in this editorial delve into various aspects of digital transformation in education. From exploring students' experiences with distance education and videoconferencing fatigue to examining the impact of video games on teacher training and the teaching of programming and computational thinking, the studies offer valuable insights into the challenges and opportunities presented by the digital age.

The research contributions are interconnected and provide a comprehensive overview of the challenges and possibilities in educational digital transformation. Firstly, "*A qualitative exploration of university students' perspectives on distance education in Jordan*" (Al-Tammemi et al.) highlights the challenges faced during the transition to online learning, emphasizing the role of academic institutions and decision-makers in shaping students' educational experiences.

The issue of videoconferencing fatigue and its impact on online student engagement is addressed in "*Videoconferencing fatigue and online student engagement among Filipino senior high school students*" (Dacillo et al.). The study reveals how excessive videoconferencing can lead to reduced energy and hinder academic performance. This highlights the need for well-designed online learning experiences that promote active engagement and mitigate the negative effects of videoconferencing fatigue.

"*Psychometric study of a scale on the use of video games for the initial training of teachers*" (González et al.) presents the potential of video games as tools for teacher training. The study's findings demonstrate that incorporating video games into teacher education can be effective and align with pedagogical objectives.

The global perspective on the teaching of programming and computational thinking is explored in "*Review on the teaching of programming and computational thinking in the world*" (Belmar a). While some countries have embraced these subjects in their curricula, the study underscores the disparities in implementation worldwide.

"*Medical education during the coronavirus disease pandemic and students' mental health: a one-year follow-up*" (Bolatov et al.) examines the impact of the COVID-19 pandemic on medical education and the mental health of students. The study's findings have implications for organizing and improving the quality of medical education during crises.

Comparative analysis of students' digital competencies in Belgium and Romania is presented in "*Student's digital competences in Belgium and Romania: a comparative analysis*" (Vodă et al.). The study highlights differences in digital skillsets between students from different regions, providing valuable insights for educational policy and curriculum development.

"*Views of secondary education teachers on the use of mixed reality*" (Marín-Díaz and Sampedro-Requena) explores the potential of mixed reality technology to enhance the learning process for secondary school students. The study emphasizes the importance of integrating emerging technologies in education to cater to diverse learning needs.

The impact of the COVID-19-induced shift to online assessments is investigated in "*Face-to-face versus online-based lectures: A COVID-19 induced study on assessments*" (Fisher et al.). The study reveals the differences in student performance between traditional and online

assessments, shedding light on the effectiveness of remote evaluation methods.

"*The role of talent development on business performance in Islamic rural banks*" (Nurfadilah et al.) examines the relationship between digital readiness, strategic flexibility, innovativeness, and business performance in Islamic rural banks. The study emphasizes the importance of talent development in achieving organizational goals in the digital era.

"*Digital transformation in times of crisis: challenges, attitudes, opportunities, and lessons learned from students' and faculty members' perspectives*" (Aljanazrah et al.) employs the Unified Theory of Acceptance and Use of Technology (UTAUT) to investigate the impact of digital transformation during crises. The study highlights the challenges faced by stakeholders and provides valuable insights for future crisis preparedness.

"*Modeling the relationship between digital nativity and Smartphone usage in learning English as a foreign language contexts*" (Hui et al.) explores the relationship between digital nativity and smartphone usage in language learning contexts. The study emphasizes the importance of understanding learners' digital preferences to enhance language education.

"*Digital competencies of Peruvian teachers in basic education*" (Hurtado-Mazeyra et al.) assesses the digital competencies of teachers in Peru, aligning with the European Framework of Digital Competence. The findings underscore the importance of teacher training to effectively integrate digital tools into the classroom.

"*Knowledge in digital environments: a systematic review of literature*" (Platonova et al.) offers a comprehensive review of research on knowledge creation and sharing in digital environments. The study identifies various theoretical approaches and models used to understand knowledge processes in the digital age.

"*Enhancing cognitive combat readiness: gamers' Behaviors concentrating on convergent learning style, tacit-latent, and kinetic-active knowledge acquisitions*" (Sumiyana et al.) explores the cognitive benefits of gaming in combat readiness. The study underscores the potential of gamified learning to develop critical cognitive skills in military contexts.

"*Student evaluation of teacher digital skills at Granada University*" (Alonso-García et al.) examines students' perceptions of their teachers' digital skills. The study emphasizes the importance of educators'

technological proficiency in providing effective digital learning experiences.

"*The impact of the digital divide on synchronous online teaching in Kazakhstan during COVID-19 school closures*" (Amirova et al.) investigates how the digital divide affected synchronous online teaching in Kazakhstan during the COVID-19 pandemic. The study highlights the need for equitable access to technology and digital skills training to ensure inclusive education.

"*Teaching computer programming: impact of Brown and Wilson's didactical principles*" (Belmar b) focuses on the application of didactics to computer programming education. The study underscores the significance of pedagogical approaches in developing programming skills among students.

"*Task design for online learning: the case of middle school mathematics and science teachers*" (Daher et al.) examines task design in online learning environments. The study highlights the importance of well-structured tasks to facilitate effective online instruction.

"*Social robotics in music education: a systematic review*" (Martinez-Roig et al.) explores the role of social robotics in music education. The study emphasizes the potential of robotics to enhance musical learning experiences and bridge the gap between technology and the arts.

"*Lëttëra web platform: a game-based learning approach with the use of technology for reading competence*" (Uhlig et al.) focuses on game-based learning approaches to improve reading literacy. The study highlights the Lëttëra platform as a promising tool for enhancing reading instruction in secondary schools.

The research contributions presented in this editorial collectively highlight the multifaceted nature of educational digital transformation and the challenges it brings for competence development. The studies underscore the significance of well-designed and inclusive digital learning experiences, as well as the importance of preparing educators with the necessary digital competencies to deliver effective instruction.

The integration of technology, including video games, mixed reality, and social robotics, emerges as a promising approach to enhance student engagement and learning outcomes. These technologies offer new avenues

for interactive and immersive learning experiences, catering to the diverse learning preferences of students.

The impact of the COVID-19 pandemic on education is a recurring theme in several contributions, reflecting the profound disruptions caused by the sudden shift to online learning. The studies examining the challenges faced during this crisis emphasize the importance of resilience and adaptability in the face of unforeseen circumstances. The lessons learned from these experiences can inform future crisis preparedness and educational continuity plans.

Addressing the digital divide remains a critical concern in the context of educational digital transformation. Studies such as "*The impact of the digital divide on synchronous online teaching in Kazakhstan during COVID-19 school closures*" (Amirova et al.) shed light on the unequal access to technology and digital skills, which can hinder students' participation and success in online learning. Bridging this divide requires concerted efforts from policymakers, educators, and stakeholders to ensure equitable access to technology and digital resources for all learners.

Teacher training and professional development play a crucial role in ensuring the successful integration of digital tools in the classroom. The research on "*Development of the teacher's technological pedagogical content knowledge (TPACK) from lesson study: a systematic review*" (Sierra et al.) highlights the significance of TPACK as a framework for preparing teachers to effectively leverage technology in their teaching practices. Investing in teacher training that focuses on digital competencies and pedagogical approaches is essential for empowering educators to create meaningful and impactful digital learning experiences.

The international perspective presented in "*Review on the teaching of programming and computational thinking in the world*" (Belmar a) underscores the need for global collaboration and knowledge sharing in advancing digital literacy and computational thinking education. Recognizing the disparities in the implementation of these subjects, especially in Latin America and Africa, calls for collective efforts to promote digital competence worldwide.

Moreover, student evaluations of teachers' digital skills, as explored in "*Student evaluation of teacher digital skills at Granada University*," (Alonso-García et al.) demonstrate the importance of understanding and addressing educators' digital proficiency. Providing support and resources to

teachers to enhance their digital skills fosters a conducive learning environment that harnesses the full potential of technology.

The adoption of gamified learning approaches, such as "*Enhancing cognitive combat readiness: Gamers' Behaviors concentrating on convergent learning style, tacit-latent, and kinetic-active knowledge acquisitions*," (Sumiyana et al.) signifies the transformative potential of gaming in education. Leveraging gamification can enhance motivation, problem-solving skills, and critical thinking, making learning more engaging and effective.

Throughout the contributions, the need for a well-structured and thoughtful approach to digital learning design is evident. Effective task design, as explored in "*Task design for online learning: the case of middle school mathematics and science teachers*," (Daher et al.) is crucial in creating engaging and meaningful learning experiences in virtual environments.

The intersection of technology and creativity is also evident in "*Social robotics in music education: a systematic review*," (Martinez-Roig et al.) which underscores the importance of incorporating technology in the arts. By embracing social robotics in music education, educators can create novel and inspiring learning experiences that resonate with students.

While the research contributions provide valuable insights into the challenges and opportunities in educational digital transformation, they also pave the way for future research and exploration. As technology continues to evolve, it will undoubtedly present new challenges and possibilities for educational development.

In conclusion, the Research Topic "*Educational Digital Transformation: New Technological Challenges for Competence Development*" has highlighted the transformative impact of technology on education. The studies presented in this editorial underscore the significance of preparing students and educators for the digital era, fostering digital competencies, and creating inclusive and engaging digital learning experiences. The research also draws attention to the need for addressing the digital divide and ensuring equitable access to technology and digital resources. By embracing innovative technologies, such as social robotics and gamified learning, educational institutions can harness the full potential of digital transformation to enhance competence development and prepare learners for success in the 21st century (Romero-Tena et al., 2020; Pinto

Santos et al., 2023). As the digital landscape continues to evolve, ongoing research and collaborative efforts are vital to ensure that educational digital transformation remains a catalyst for positive change and educational development.

Author contributions

AP-R: Writing—original draft, Writing—review and editing. CL-C: Writing—original draft, Writing—review and editing. JC-A: Writing—original draft, Writing—review and editing.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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