

The education revolution in the digital age

Artificial intelligence and immersive realities



by Diego Vergara Rodríguez

Both companies and society itself are adapting to an increasingly digitalised world. Faced with this new paradigm, education also has to be transformed and redirected towards a model that helps students to rise to the new challenges they will face in today's society. It would probably be foolhardy to forgo this adaptation of the teaching-learning process to the new digital age. Technology is advancing at breakneck speed, and those who fail to integrate it effectively into their educational practices run the risk of being left behind. In addition to the familiar information and communication technologies (ICT), the digital revolution has arrived with artificial intelligence (AI) applications and extended reality (XR), which encompasses virtual reality (VR), augmented reality (AR) and mixed reality (MR).

It is foolhardy to forego adapting education to the digital age in a world where technology is advancing extremely quickly

NEW LEARNING EXPERIENCES

These latest technologies are truly revolutionising education, giving rise to an urgent reflection on what the future of learning will look like in a wide range of fields, such as technology, architecture, art, history, nature, literature, etc. VR, AR and MR offer new forms of immersive and collaborative learning experiences. VR allows students to virtually explore environments that would otherwise be inaccessible. AR superimposes digital information on the real world to enrich interaction with the physical environment. MR integrates virtual and real elements to provide even more immersive and realistic experiences. Nonetheless, although the societal trend is towards creating immersive experiences, non-immersive VR currently appears to be better suited to education. In addition, there are concerns that overexposure to virtual environments may have negative effects on students' mental health and well-being, highlighting the importance of carefully balancing screen time and other activities. Future generations' personality and behaviour will surely be shaped by the intrinsic features of being born in this new digital age.



106

107

diàlegs

OPINION



Extended reality offers immersive learning experiences that revolutionise the study of disciplines

Looking ahead, the implementation of AI in VR, AR and/or MR environments promises even more exciting developments in education. AI systems are expected to become more sophisticated and capable of seamlessly adapting to learners' individual needs and providing more natural and contextual interactions. In addition, AI can facilitate the creation of virtual environments and personalised learning experiences in real time, allowing for greater flexibility and efficiency in teaching and learning.

PERSONALISED EDUCATION AND ETHICS

However, the adoption of AI in education raises ethical challenges which have to be carefully considered to ensure equitable and responsible educational development. The assistance that certain AI applications can provide students can lead to a fraudulent use of these resources, which would seriously damage their capacity for reflection, effort, critical thinking, etc. In this sense, we should teach not only how to use different AI applications but also the way they should be used, taking advantage of the potential they offer but in an ethical and responsible way.

In education, AI promises to make definitive strides towards personalised learning, including improvements in efficiency and broadening access to education. For example, smart tutoring systems can adapt to individual students' pace and learning style and provide instant feedback and personalised resources. In addition, the potential integration of AI in VR, AR and MR environments can offer new opportunities to develop personalised immersive educational experiences. For example, we can already imagine our students exploring ancient history through a virtual reality simulation, or solving complex mathematical exercises or problems with the help of a virtual tutor in augmented reality.

However, this opportunity for personalisation afforded by the convergence of AI and XR also opens up another important ethical issue: data privacy. This is because the use of AI algorithms to personalise learning requires a significant amount of personal information on the learner. On the other hand, another ethical factor to reflect on is how to determine the intellectual property of a new AI-generated creation (images, videos, presentations, etc.).

It is crucial to teach students to use artificial intelligence ethically while maximising its potential



Ethical engagement in the implementation of technology will ensure fairer and more inclusive education.

Ultimately, educating in the digital age requires a balanced approach that harnesses the benefits of technology while addressing the ethical and pedagogical challenges that arise. AI and XR have the potential to revolutionise education, but they have to be implemented carefully and responsibly. It is essential to prioritise equity, privacy and autonomy in the design and use of educational technologies, while fostering digital and ethical literacy among students and educators.

The developments that this digital age will bring will undoubtedly affect the evolution of education and force it to adapt to these new times. But in order to fully harness the transformative power of technology and thereby build a more fair, equitable and humane educational future, we have to remain committed to ethical values that promote all students' inclusion and well-being. In this sense, future teachers will need to teach not only subject-specific content but also lessons on how to use AI-based tools or apps responsibly.

Diego Vergara Rodríguez holds a PhD from the University of Salamanca (USAL) in Mechanical and Materials Engineering. He is a Materials Engineer and Technical Engineer in Public Works, USAL. He is a graduate in Mechanical Engineering from the Catholic University of Avila (UCAV). He is a researcher and lecturer at the UCAV, and Dean of the Faculty of Science and Arts at the UCAV. He is the Director of the TiDEE.rg Research Group (Technology, Instruction and Design in Engineering and Education). His main lines of research are related to two fields: energy efficiency and materials science, and educational technologies and active learning methodologies. His work has led him to be listed in the Stanford ranking, which recognises the top 2% of scientists with the highest number of citations worldwide.