Disruptive innovation in education

The impact of generative AI in the classroom

by Manel Soengas

ChatGPT appeared on 30 November 2022 and within days had been adopted and used by one million users. The breakthroughs and societal impact of artificial intelligence (AI) have been widely reported. The 6D model of digitised technologies[1] shows the keys to mass adoption.

Generative models' processing and knowledge-creation capabilities have an impact on education. The fact that AI emulates certain human cognitive skills which are fundamental in the development of learning has led governments and educational administrations to propose a new educational paradigm.[2]

ARTIFICIAL INTELLIGENCE AND SOCIETY

Neal Stephenson's book "**The Diamond Age**" features 'Young Lady's Illustrated Primer', a device like an e-book that is used as an educational tool; it is managed by advanced artificial intelligence that provides individualised tutoring and guidance and adapts to each user's specific circumstances and learning needs. This device becomes the main character's inseparable companion.

The plot of the book makes me wonder whether in the nearer or more distant future, generative tools such as ChatGPT will be able to create other AI-based systems that can be used as assistants to monitor students' learning and development process and support them in much of their lives. This idea leads to other no less important questions: Will any student, regardless of their social status, have access to individualised tutoring to assess and monitor their academic progress with the aim of improving the learning process? Will freedom be lost? Are we ready to adopt disruptive technologies? Is it essential to prepare future citizens to be resilient?

CHATGPT ENTERS THE CLASSROOM

In recent decades, the educational system has been

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attentive to the adoption and application of different technological projects at schools, with disparate results. However, with the emergence of ChatGPT, the educational community has quickly understood the scope of the transformation. Just to cite a few examples, these technologies can generate personalised learning materials, create simulated and immersive virtual environments, generate educational content, offer writing and research assistance, assess assignments and provide feedback on a subject or area.

Despite the enrichment of the educational setting, the integration of GenAI in education opens the door to risks and challenges:[3]

– Getting an accurate, relevant answer depends on defining a good prompt.
– False or unrelated answers to the question asked can be generated, even though they appear coherent.
– Reliance on AI-based tools can diminish creativity or critical thinking.
– Confidential data from stored conversations may be used to train the model in the future.

The integration of generative artificial intelligence in education opens the door to risks and challenges

– Human interaction and supervision is essential for students' proper social and emotional development.
– The type of data used in training determines the accuracy and reliability of the response, as well as whether bias is perpetuated and stereotypes accentuated.
– Ethics and responsibility are needed in relation to intellectual property, control, plagiarism and data protection.

Regarding teachers,[4] their position changes and adapts to the moment in time. Initially, teachers were concerned about the fact that plagiarism was made easier by the use of technology. Subsequently, in the second stage they saw the possibility of automating tasks within the domain of the field or subject. Finally,

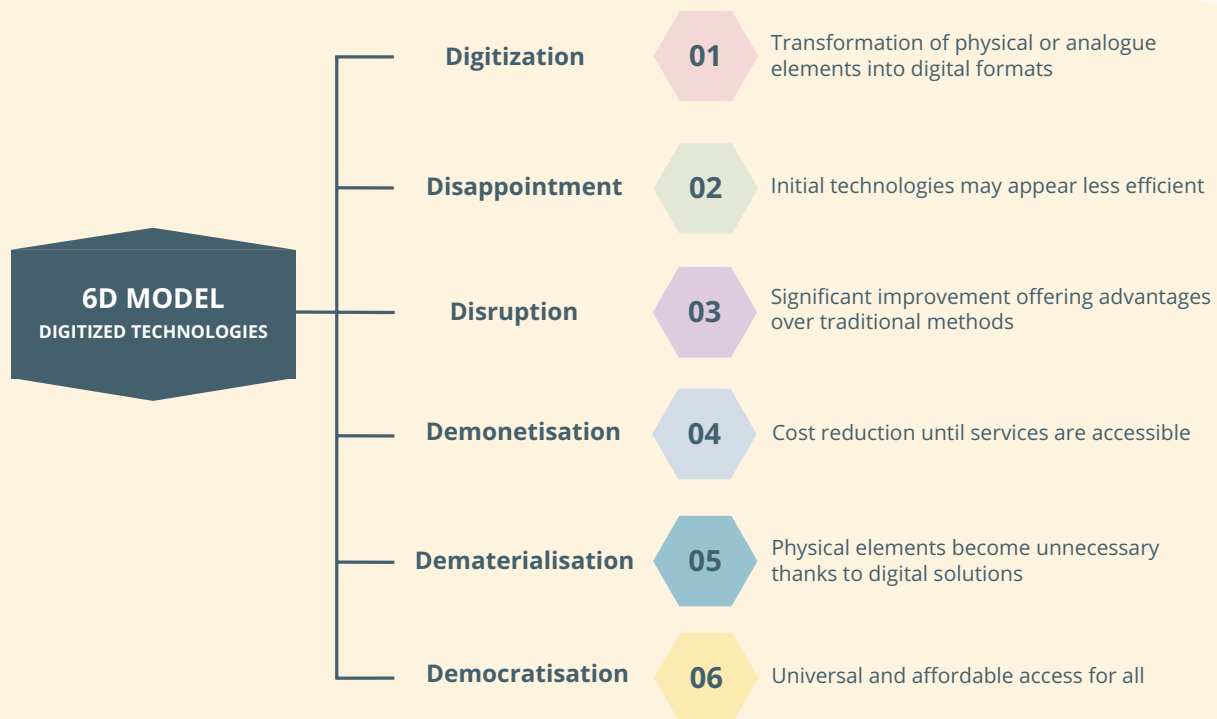| 6D MODEL DIGITIZED TECHNOLOGIES			
Digitization	01	Transformation of physical or analogue elements into digital formats
Disappointment	02	Initial technologies may appear less efficient
Disruption	03	Significant improvement offering advantages over traditional methods
Demonetisation	04	Cost reduction until services are accessible
Dematerialisation	05	Physical elements become unnecessary thanks to digital solutions
Democratisation	06	Universal and affordable access for all

Figure 1. The 6D model

they value the possibilities offered by GenAI to improve educational and assessment experiences.

Likewise, educational administrations[5] are facing a series of ethical and social challenges, and in order to achieve them, it is essential to:

– Define strategies to integrate AI developments in the technological domains.
– Ensure compliance with the legal framework related to data processing.
– Limit dependence on tech companies outside the education sector.
– Devise an ethical code of practice to serve as a reference and guidance framework.

ARTIFICIAL INTELLIGENCE: ETHICAL CHALLENGES

Despite the existence of a document published by the Department of Education[6] containing guidelines and recommendations, there are no regulations to help schools and teachers to integrate AI in the classroom, and the curriculum at the different educational levels does not specify the competencies that students should achieve in this area. Last March, the law to regulate artificial intelligence[7] was approved in the European Parliament. This law guarantees security and respect for fundamental rights while boosting innovation. It establishes a number of risk levels depending on the area in which it is used, as well as obligations. For example, any use of AI that implies a risk to individuals' safety or rights is prohibited. In the specific case of education, the use of AI for processing emotions or biometric recognition is prohibited, and any AI rolled out in critical infrastructures such as the education system is categorised as high risk. In this case, an impact assessment is required prior to roll-out.

The law aims to ensure fairness and eliminate bias, understand the mechanism that leads an AI-based system to provide a given response, strengthen privacy and data protection, preserve the reliability and security of AI-based systems and ensure inclusiveness and accessibility.

CONCLUSIONS

The use of generative AI in education is revolutionising classrooms and offering opportunities to personalise

These technologies can create personalised learning materials or immersive simulated virtual environments

Administrations have to develop educational strategies and policies to ensure they are used ethically and responsibly

learning and improve assessment. The AI-based assessment process is fairer, richer and more inclusive. It allows students to be assessed over longer periods of time, with an evidence-based perspective and at a lower emotional cost, and it would reduce students' current oversaturation. However, the challenges and threats are significant, such as the management of critical data, the possible decline in critical thinking and the associated ethical risks. The adoption of this technology is inevitable, so teachers and administrations need to develop educational strategies and policies to ensure that it is used ethically and responsibly. AI training and policy regulation are key factors in prepare students for a future where technology and humanity complement each other.

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