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Smart technologies in support of creative teaching-learning processes

Reis, José Luís[1,3]; Alves, Carlos[1,2]; Marques do Santos, José Paulo[1,3]

[1] University of Maia, UNICES, Maia, Portugal
[2] University of Minho, ALGORITMI Centre/LASI, Braga, Portugal
[3] LIACC, Artificial Intelligence and Computer Science Laboratory, University of Porto, Porto, Portugal

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Introduction

This study aims to investigate the impact of smart technologies in facilitating creative teaching and learning processes. With the advent of the digital era, a diverse array of technological resources has emerged, revolutionizing education methods (Akour & Das, 2020), (Henderson *et al.*, 2017). Smart technologies play a crucial role in this transformation, enabling highly dynamic, interactive, and personalized approaches to teaching and learning materials (Palanisamy *et al.*, 2020).

Smart Technologies

Intelligent technologies encompass systems and devices equipped with automated processing and learning capabilities, as pointed out by Palanisamy et al. (2020). These technological advancements empower data collection, analysis, and interpretation, facilitating intelligent interactions with users. Prominent instances of smart technologies include virtual assistants, virtual reality, artificial intelligence, and machine learning, as Akour and Das (2020) highlighted.

Benefits of smart technologies in teaching and learning

Smart technologies offer several significant benefits in the teaching-learning context. One of the main advantages is the personalization of learning. Based on data collected on learners, smart technologies can tailor content and activities according to individual needs, providing a more relevant and effective learning experience.

In addition, smart technologies promote interactivity. Learners can actively engage with the content through simulations, educational games, and immersive virtual environments. This stimulates their involvement and interest, making learning more engaging and memorable (Akour & Das, 2020).

Another benefit is accessibility. Smart technologies can overcome physical and geographical barriers, allowing learners to access content and participate in activities from anywhere and anytime. This is especially relevant in distance education contexts where learners can access educational resources equally (Henderson *et al.*, 2017).

Examples of application of smart technologies in education

Smart technologies have been applied in various ways in the educational context. Some examples are described above.

Virtual assistants: Virtual assistants like Siri, Alexa, and Google Assistant offer valuable support to learners by helping them discover information, accomplish tasks,

and respond to inquiries. They provide prompt and precise answers, enhancing research efficiency and flexibility. Additionally, these assistants offer educational resources like podcasts, as mentioned in the works of (Emerling et al., 2020; Terzopoulos & Satratzemi, 2019; Tsourakas, Terzopoulos, & Goumas, 2021; Kye *et al.*,2021).

Virtual and augmented reality: Virtual and augmented reality technologies offer captivating experiences that can greatly enhance the learning process. Learners can immerse themselves in virtual environments, explore distant places, interact with 3D objects, and even engage in real-world scenarios in a safe and controlled manner. The metaverse concept, particularly in virtual reality, has gained significance in education. Notably, it has been employed in STEM subjects (Science, Technology, Engineering, and Mathematics) with a considerable adoption rate of 53% (Kukulska-Hulme *et al.*, 2023; Palanisamy *et al.*, 2020; Zainab & Huda, 2020; McGovern, Moreira, & Luna-Nevarez, 2020).

AI tools: ChatGPT-4, ChatGPT, and Bard are the most well-known generative AI tools. They are designed to engage in conversations with their users and are tools that use large knowledge bases. For example, ChatGPT has been trained with 300 billion words (Kukulska-Hulme, 2023). The use of AI tools in education requires the adoption of better pedagogies, including adapting teaching practices, personalizing learning, supporting collaboration, training students, considering ethics, reconsidering assessment practices, and raising awareness of the benefits and challenges (Tahiru & Agbesi, 2021; Tahiru, 2021).

Final considerations

Smart technologies will be crucial in transforming the way we learn and teach. They offer opportunities for personalization, interactivity, and accessibility, making the teaching-learning process more engaging and effective. However, it is important to realize that technology alone does not guarantee educational success. It requires careful planning, teacher involvement, and the smooth integration of technologies into the curriculum. By using smart technologies appropriately, we can create enriching learning environments that stimulate creativity, collaboration, and critical thinking.

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