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Using Simulation and Serious Games in STEM Education

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ABSTRACT

The evolution of computer technologies, together with the increasing speed of Internet-based communications, has promoted the use of simulation software and serious games in higher education [1]. These technological and methodological tools can significantly enrich the learning experience in almost any knowledge area. In particular, they will have a significant impact on how the learning process is performed in the so called Science, Technology, Engineering, and Mathematics (STEM) education. This work reviews the state-of-the art regarding the use of serious games and simulations in higher education. Technological and pedagogical characteristics of these innovative learning tools are explored, alongside their cultural, technological, and/or social contexts. Among others, the article explores topics such as: (i) the benefits of teaching practices based on the utilisation of games and simulations, for institutions, instructors, and students [2]; (ii) the use of video games and apps to increase student engagement, retention, and academic achievement; (iii) the enrichment of simulation-based learning scenarios by the incorporation of the tactile experience to the more traditional visual and hearing ones [3]; (iv) the use of adapted virtual learning environments that simulate real-life environments [4]; and (v) the analysis of collaborative intergenerational interaction throughout digital games.

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