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Editorial

Special Issue on Advanced Technologies in Lifelong Learning

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The rapid changes in today's society, and in the labor market, require workers to undergo constant retraining in order to update and adapt their knowledge and skills throughout their lives. This new education needs occur at a time of transformation of face-to-face education, along with the expansion of blended and online education. In addition, the opportunities to collect and analyze many more data of learners' behavior and performance in face-to-face, blended, and online education, together with the development of artificial intelligence and machine learning techniques, has allowed a fast development of the field of learning analytics in order to support instructors in the redesign and adaptation of their contents and classes. This is in addition to learners in increasing their awareness on their progress, and in the development of their self-regulated learning skills, among others. This Special Issue on Advanced Technologies in Lifelong Learning was aimed at collecting and presenting breakthrough research on educational technology with a focus on lifelong learning, including topics such as Massive Open Online Courses (MOOCs), Learning Analytics, Augmented and Virtual Reality, Mobile and Wearable Technologies, or Machine Learning and Artificial Intelligence applied to education, among others.

A total of 11 papers (nine research papers, one review paper, and one technical note) are presented in this Special Issue. Martin-Gutierrez et al. [1] presented an augmented reality (AR)-based application designed to teach and train guitar chords, including short melodies consisting of four chord transitions so that users must change hand and finger positions. Chang and Hu [2] integrated college library borrowing data and an interactive artwork to create an information visualization service so that users in the library can access to it through their own smartphones. García-Molina et al. [3] proposed an algorithm to automatically calculate learners' grades in the MOOC forum, considering both the quantitative dimension and the relevance in their contributions; this algorithm was implemented in a web application to be used by MOOC instructors. Kadlečík et al. [4] created a didactically effective MOOC to support the solution of causal research problems in the domain of learning theory in informatics. Salazar-Fernandez et al. [5] presented a curricular analytics approach at the program level and analyzed how educational trajectories of undergraduate students in high-failure rate courses could help to describe the process that leads to late dropout. Babusiak et al. [6] analyzed the effect of serious games on players' brain activity, and implemented a method based on various signal processing techniques for evaluating electroencephalographic data. Urdaneta-Ponte et al. [7] proposed the use of an ontology to model job sectors and areas of knowledge, and to represent professional skills that could be automatically updated using profiled data and machine learning for clustering entities. Salazar-Fernandez et al. [8] studied curricular trajectories as processes using process mining techniques and the Backpack Process Model (BPPM). Criollo-C et al. [9] focused on the effect of an augmented reality mobile application (NetAR) as a complement to traditional education for engineering students. Finally, the review paper by Criollo-C et al. [10] did a literature review on mobile learning, while the technical note by Hong et al. [11] presented HearIt, an auditory-cue-based audio playback control that provides semantic-level skip control with auditory cues for auditory information browsing.

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