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EDITORIAL

Smart Learning in Smart Cities

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Commonly, the term *smart learning* is connected to the use of smart *learning environments*, with reference to the combination of software and hardware used for education and training by universities, schools, institutions and industries. In this field of application, in recent years, we have observed a never-ending succession of innovations in support of learning and instruction where instructional designers and developers run-after every new technology, to create innovative applications based on what they believe more effective, efficient, and engaging for both learners and teachers (Spector, 2014). Then, such software environments can be more or less smart, depending on the number and the quality of services offered and the capability of interacting with other systems. Another possible interpretation is to consider *smart learning* as learning *in smart environments* and, in this respect, Koper (2014) defines smart learning environments as physical places enriched with digital, context-aware and adaptive devices, which promote better and faster learning. For what concerns smart cities, we observe that they should be considered the most advanced implementations of smart environments, since they are plenty of physical devices and systems, used to provide citizens with highly effective services, to the aim of improving their quality of life. In fact, cities are smart when they fully exploit newly available smart technologies and smart solutions, which rely on most recent advancements in, e.g., big data, analytics, cloud architectures, artificial intelligence and cognitive computing. Moreover, recent modifications in both laws and policy, also driven by economics and market trends, are dramatically changing learning processes and environments in the universities so that students are regarded as customers and, consequently, the objective is enhancing their satisfaction, which can be achieved by improving the overall quality of services. Since the main task of schools and universities is education, we observe that their role in forming smart citizens, also contributing to enhance the individuals' quality of life, is of paramount importance. In conclusion, smart learning environments and smart cities adopt the same set of technologies and pursue the same objective of empowering people, thus, a new powerful educational ecosystem has to be considered, where learning involves students and teachers, which are primarily citizens.

In this ***Special Issue*** of the Journal of e-Learning and Knowledge Society, we focus on these aspects and we present both technical papers and surveys on education initiatives that follow the above-cited principles. In more detail, we report experiences on a variety of problems linked to the smart-factor in e-Learning and, in eight contributions, we illustrate a variety of points of view and different fields of application in different Countries.

L. Caviglione and M. Coccoli, in their *A holistic model for security of learning applications in smart cities* consider the idea of advanced learning frameworks that take advantages from the interconnection among individuals, multimedia

artefacts, places, events, and physical objects that characterize any smart city. To do this, they consider smart cities as a playground plenty of data, which can be exploited to implement many learning activities. Given this scenario, the authors focus on the inherent privacy and security risks and introduce a model to help the engineering of novel learning frameworks for smart cities.

S. Siddiqui, M. Thomas, and N.N. Soomro, in their *Technology integration in education: source of intrinsic motivation, self-efficacy and performance,* investigate the effectiveness of a blended learning program through experimental setup in the South Asian context. The authors designed and tested a specific blended learning program for chemistry to the aim of enhancing their students' motivation. Based on the collected results, they found a significant and positive relationship between blended learning program, intrinsic motivation, self-efficacy, and academic achievements.

O.T. Adigun, in his *Computer-assisted instruction, project-based learning and achievement of deaf learners in biology*, determined the effect of computer-assisted instructions and project-based learning on academic achievement of deaf learners in biology, in Ibadan, Nigeria. The author found that computer-assisted instruction resulted more effective then problem-based learning, in enhancing achievement in biology among deaf learners. Therefore, biology teachers to deaf learners should adopt such technologies and methodologies to motivate and stimulate deaf leaners' interest in life sciences. Smart cities policies should be fair and inclusive and always try to overtake possible individual limitations.

A. Cadamuro and colleagues, in *Making the school Smart: The interactive whiteboard against disparities in children stemming from low metacognitive skills*, face the problem of providing differentiated education based on individual differences of children to stimulate effective learning. This can be achieved through smart devices such as interactive whiteboards. In their study, the authors tested the impact of new technologies and concluded that they can play an important role in supporting learning processes, especially of less metacognitive students, therefore contributing to reduce the gap between children with differential metacognitive skills.

F. Agrusti, M. Mezzini, and G. Bonavolontà, in their *Deep learning approach for predicting university dropout: a case study at Roma Tre University* consider the problem of dropout in tertiary education, which is a paramount topic in OECD Countries. Smart cities rely on both technology and smart policies, and, in this paper, deep learning is used to predict which student will likely dropout in Higher Education contexts, so to effectively launch targeted actions in order to limit such phenomenon.

E.W.F. Laksmi, Sarwanto and Chumdari, in their *Improving elementary school's critical thinking skills through three different PBL-assisted learning media viewed from learning styles*, analyze the differences in i) critical thinking skills among students provided with different learning media; ii) critical thinking skills among visual and auditory students; and iii) the interaction with the learning media. The investigation on such smart learning activities revealed that there are different skills in critical thinking in different learning media as well as some differences in critical thinking skills between visual and auditory students.

G. Albano and colleagues, in their *Technology to enable new paradigms of teaching/learning in mathematics: the digital interactive storytelling case*, propose another smart methodology implemented by means of a technology-enhanced learning activity designed specifically for learning/teaching mathematics, based on an interactive and immersive metaphor of storytelling. With their research, the authors aim to promote processes such as inquiring, conjecturing, formalizing, proving in mathematics, and to investigate which is the best way to organize smart solutions in smart schools, to achieve better results and improve performances.

A. Carbonaro, in her *Enabling smart learning systems within smart cities using open data*, highlights the opportunity to profitably exploit advanced solutions such as the linked open data platforms and automatic reasoning to effectively handle information and to use data linked queries in the domain of cognitive smart learning systems. Specifically, the author focuses on data availability to choose and develop interoperability strategies suitable for smart learning systems based on open standards and allowing seamless integration of third-party data and custom applications.

References

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