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EDITORIAL

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Focus on: Learning in Smart Environments

The latest developments in the ICT area are influencing methods, processes, and tools in education (Lee *et al*., 2013). Ubiquitous, mobile, and multiplatform computing provide an easy access to knowledge and encourage educators to redesign learning environments that operate both in the horizontal direction of the learning process (by improving both educational opportunities for everyone as well as the lifelong learning experience) as well as the vertical direction (by recovering the inclusive learning dimension of diverse people including people with special needs as well as the adaptive customization required by the multiplicity of existing disciplines).

The complex nature of the educational processes and contexts requires the identification of highly innovative learning environments which integrate a variety of "smart" strategies: cognitive learning, manipulative learning, mobile learning, adaptive learning, seamless learning, cloud-based learning and social learning (IBM, 2014; Ren & Xu, 2002; Shin *et al*., 2011; Kim *et al.*, 2011; Frankl & Bitter, 2013; Libbrecht *et al.*, 2013).

These dimensions do not overlay but blend in a synthesis "*ab initio*" thus transforming the nature of teaching and of the learning conditions. These convergences foster the creation of a "smart" learning model: open, interactive, adaptive, participative, inclusive and augmented. "Smart" learning (Noh, Ju, & Jung, 2011) is, as stated by Lee *et al.* (2013), "a new paradigm emerging through the convergence of smart pedagogies, smart content and smart information technologies. Smart pedagogies represent advanced pedagogies, and smart content is being studied from different perspectives with the evolution of e-learning" (pp. 5)". The relationship between the factors that characterize these environments (mobility, interaction, and ubiquity) can give a positive effect on learning (Oblinger, 2004; Friedel *et al.*, 2013; Shin *et al.*, 2011).

A "smart" environment is a "cognitive space" in which the way we interact with people and we access resources and big data is based on disruptive technologies. According to the latest research in the area of smart learning and smart classrooms, a smart educational environment is also referred to as a system which will raise the human computer interaction to the top level at many points for the instructors (Shi *et al.*, 2003; Ren & Xu, 2002).

An "smart" environment is an "open ecosystem" where technology and pedagogy interact in a natural way, and improve the opportunities for comprehension and performance of a learning subject (Ronghuai *et al.*, 2012).

The aim of this special issue is to attract the attention of researchers and services practitioners whose experimentation is linked to new models and applied teaching strategies.

The issue opens with the paper by **C. Giovannella** who poses a very interesting question: *Smart Learning Eco-Systems: "fashion" or "beef"?* The article aims to identify the "smartness" dimension of a learning eco-system – either real or virtual. The author applies this definition in the context of smart city learning and identifies new lines of research in the area.

The selected articles of this issue show how the merge of pedagogy and technology can bring to the development of smart environments, the transformation of curricula, the redefinition of educational settings, and the creation of new frameworks to test and validate from the point of view of the educational and cultural effectiveness.

In particular, the selected articles can be classified in two macro areas of study:

- **empirical and qualitative analysis**. The papers that fall into this category focus on "student-centered" perspective and try to identify the needs, perceptions, and desires of the users (students, teachers in training, adults in continuing education) with respect to new generation educational environments by analyzing the proposed environments in order to improve services and features.
- **experimental design of innovative environments**. The papers that fall in this category bind the smart attribute to the integration of new technologies in the traditional teaching experiences in order to improve adaptability, manipulation, collaboration and gamification. These contributions are able to identify new forms of active and social habitat in formal and informal contexts.

In the first category is also the contribution by **L. Zanazzi** and **E. Mazzoni**

"*Comparing the use of SNSs among adult and emergent adults*". The authors advocate the idea that modern social media are part of an attitude gradually more pervasive to conduct the existence in a more social manner. The goal is to understand the differences that characterize Early Emergent Adults (EEAs), adults around 24 years old, Late Emergent Adults (LEAs), adults from 24 to 30 years old, and Adults themselves (adults over 30 years) in the use of social spaces to share and maintain social capital and facilitate the transition between various contexts and activity systems. The understanding of these uses and of the differences helps people in defining new smart environments for lifelong education.

Finally, in the same category we find the paper by **Soh O-K** and **Hong-Fa** who seek to understand the educational effectiveness and students' perception of some smart applications. In their contribution "*Students' perceptions toward the Use of Dialogic Feedback in Mobile Applications for Students' Writing: A Qualitative Case Study*" the authors describe a mobile application for the dialogical feedback (m-App) in order to improve the writing skills of students. The paper shows that, even though the research is still in its initial state, the feedback is a didactic dimension able to act upon both the student performance and the student motivation. The application is presented as an element for the improvement of future design of intelligent and adaptive tutoring components.

To the second category fall the remaining papers. The first is the paper by **L. A. Ludovico** and **G. Mangione** "*Teaching adaptively for Music*" in which the authors ponder whether to include the adaptive component in learning environments designed for teaching music and focus on the possibility of making them more inclusive from the point of view of the contents and of the musical notation. The article introduces an innovative framework based on research on adaptively teaching that uses the IEEE 1599 music description standard. A series of concrete scenarios tests the value of this framework in an individualized teaching and learner-centered context.

The article by **A. Tore *et al.***, "*IKeWYSe - I Know What You See An educational tool for perspective-taking skills*" presents a research project resulting from the collaboration between young researchers from the University of Salerno and the University Oberta de Catalunya. In the paper the authors describe an evolution of narrative video games and measure the ability of the perspective grip of the player in order to understand the degree of empathy supported by the teaching experience. The semantic modeling of the game helps define smart narrative events aimed at adapting feedback, situations and points of view supporting the correct understanding of the concepts and facts related to the

history that the game presents.

The contribution "*Bridging Digital and Physical Educational Games Using RFID/NFC Technologies*" by **O. Miglino *et al.*** derives from the BlockMagic project (517936-LLP-1-EN-COMENIUS-CMP). The paper discusses the use of RFID/NFC technology for improving traditional educational games. The ability to connect physical objects with mobile devices (i.e. "Internet of things") allows teachers to create and rethink the educational activities in smaller environments where the manipulative dimension becomes "smart" and meets the needs of the digital natives. The paper presents three different prototypes: Block Magic (an active and adaptive educational game for pre-school based on logic blocks), Walden PECS (an augmented environment for autistic children), and WandBot (an environment that integrates toy robots, RFID technology and a serious game for entertainment in a museum). These environments that support the development of some cognitive and behavioral skills, point out the need to innovate the educational contexts in order to make them more active, inclusive and adaptive.

A. Peace *et al.* of the ERID lab of the University of Foggia provide an innovative contribution with the design of a smart environment in social media. SPLASH ("*Smart platform for learning and active social habitat*") is an environment resulting from a co-design process for the support of "active and deep learning" in school via spaces of collaborative practice.

The article by **P. Maresca *et al.*** "*Experiences in Collaborative learning*" discuss the improvement of the educational university system by designing learning environments that promote experiences of collaboration in order to meet the challenges posed by new learning trends. The paper analyzes the results of ETCplus, an innovative project supported by the IBM Academy Initiative. The project, which extends the paradigm ETC (Enhancing Team Cooperation), has as its objective to promote a new model of collaboration in education environments in academia. The experience aims to create an open innovation network capable of supporting the emergence and maintenance of "intelligent" communities. The project involves Italian and foreign universities that share educational objectives, courses, and innovative platforms of cooperation and co-design.

Finally, the paper by **M. Coccoli** "*Using web radio in mobile learning*" presents also results in the area of collaboration and social media. The paper proposes a "Web radio mobile social networking education model" that promotes the use of a web radio channel as an educational tool to better integrate

the social components derived from 2.0 environments such as Twitter and Facebook, with the opportunities generated by mobile and ubiquitous learning to renew university teaching in the Italian university system.

The reading of this issue will allow readers to form an idea, although not exhaustive, on how the smart dimension can be viewed and integrated into the sphere of education and how it can foster the definition of advanced environments that expand the educational opportunities and intervene positively in the teaching and learning processes.

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