

EDITORIAL

by Teresa Roselli and Veronica Rossano

Focus on: Gamification and Serious Game for Learning

Experimental evidences have largely proved the effectiveness of the Game-based Learning approach over the years (Papastergiour, 2009; Prensky, 2001; Rosas, 2003; Rieber, 1996). Currently, the debate in the Educational Technologies field is being focused on Gamification and Serious Game for learning. In the past, they were used indifferently but the concepts are profoundly different. Gamification is about the game mechanics and rules applied to non-gaming contexts (Deterding *et al.*, 2011; Zichermann *et al.*, 2011). In other words, the Gamification proposes to use the game thinking and dynamics to increase student's engagement and stimulate their active participation in order to enhance the learning outcomes. Serious game, instead, are the use of (video) games and simulations "that do not have entertainment, enjoyment or fun as their primary purpose" (Michael & Chen, 2005). Serious games have been applied to different kinds of contexts, such as education, marketing, politics, healthcare, fitness, and so on.

Gamification and Serious Game were mainly used in enterprise for job training and for marketing purposes in order to increase users' interest and make the training process more enjoyable, engaging and effective. The gamification implied by Dutch bank Knab, is an interesting example, the gamification addressed to their contact centre aimed at both increasing the efficiency of the workers and strengthening the knowledge of their agents (Van den Berg, 2015).

In the latest years, the use of game for educational purposes is spreading. The games, as stated by (Papastergiour, 2009; Oblinger, 2004), are powerful learning environments since they: support multisensory, active, experiential and problem-based learning; promote the recovery of prior knowledge, because players must use previously learned information to improve their score in the game; provide immediate feedback that allows players to test different hypotheses and learn from their actions; provide effective self-assessment tools

such as the mechanisms score and the achievement of different levels; involve the community of players in the learning process.

Following these directions, the special issue focuses on the challenges and opportunities that gamification and serious games present for the educational processes. The objective of this special issue is to bring actual theoretical and applied researches in the fields of gamification and serious game in education.

The journal starts with the paper by **Filomena Faiella** and **Maria Ricciardi**, entitled *Gamification and learning: a review of issues and research*, that presents a **literature review on gamification**. The goal of the authors is the state of the art of gamification approach in education to improve motivation and engagement, and maximize learning outcomes. The factors of motivation, engagement, and learning outcomes have by far been the most extensively studied of the numerous factors that gamification seems to influence. In the paper different findings of empirical investigations are described in order to study how gamification impacts on them. Moreover, the authors suggest some interesting research trends to be pursued in the gamification area.

Then some different solutions have been designed and evaluated for different purposes, some of them are addressed to use Gamification and Serious game **to support collaborative and social learning**. The paper by **Gianvito D'Aprile**, **Pierpaolo Di Bitonto**, **Roberta De Asmundis**, **Antonio Ulloa Severino**, entitled *Social, constructivist and informal learning processes: together on the edge for designing digital game-based learning environments*, it is an example. The authors state that socio-constructivist learning theories provide a powerful framework for designing Game-Based Learning Environments. Thus, the paper focused on the social, constructivist and informal learning processes as relevant levers able to support the design and development of a digital serious game, named Cibopolis (Cibus=Food and Polis=City). The serious game aims at educating on nutrition and healthy lifestyle and it involves players as learners in collaborative participation and knowledge building. Indeed, Cibopolis has been designed to support the dynamics of social networking, where learners may follow the other members of the community, comment the posts and put 'like' to them.

On this track is also the paper by **Chang-Hsin** and **Ju-Ling Shih**, entitled *Evaluations to the gamification effectiveness of digital game-based adventure education course – GILT* which presents the designing of a digital game-based adventure education course for team-building purposes. The developed digital games are based on Tuckman's model of team development stages, which

embed four main elements, game (G), interaction (I), learning (L), and team-building (T). The goal is to allow all groups to learn to make team-building process more efficient and to become high performance groups. This study investigates two research questions: Do teenagers learn adventure education themes, problem-solving skills, and positive interpersonal interactions throughout the GILT course? What are teenagers' attitudes toward the digital games in the GILT course? The results show that teenager's have positive attitudes toward the learning themes of adventure education, problem-solving abilities, interpersonal interactions, and game effectiveness.

Both the papers just described use the **gamification for training purposes**, like the paper by **Vincenzo Petruzzi** and **Marco Amicucci** entitled *ACT - A new game-based methodology for Anti-Corruption Training* that presents a game-based learning tool aimed at promoting a new awareness among citizens that can transform their perception of corruption and help them recognise and change their own attitudes and behaviours. The game can create experiences that will have a deep impact on the attitudes and behaviours of individuals, and this is precisely the objective of a training course aimed at preventing, rather than merely repressing, corruption. In this view, the proposed game offers a training experience offered by, using a non-blaming, non-paternalistic approach, along with immersion in a learning environment designed to optimise involvement and motivation, helps players identify those mechanisms that unconsciously modify the perception of their own attitudes, behaviours or language.

In the last few years, the use of video-courses in the learning processes is spreading quickly thanks to the new form of online education: the MOOCs (Massive Open Online Courses). In this context, it could be interesting to investigate **the application of gamification to video-course**. This is the aim of the paper by **Mauro Coccoli**, **Saverio Iacono**, **Gianni Vercelli**, entitled *Applying gamification techniques to enhance effectiveness of video-lessons*, which describes the gamification-oriented design process adopted to implement a video-course on office automation programs. The design of the gamification process is following the hype for the launch of the new Star Wars™, Episode 7. The video-course includes both tutorial and fictional videos, as well as screen shots that users can use according to their individuals' learning needs and objectives. The gamification elements used are engaging narrations, in which the learners make progressions which result in advancements in the plot; quests, which represent the mechanics of challenge; win state and resources acquisition, where the resources are specific components, such as badges, and dark side points.

Other interesting researches are addressed to the **use of gamification in the learning assessment process**. In this issue, for example, the paper by **Selay Arkün Kocadere, Şeyma Çağlar**, entitled *The design and implementation of a gamified assessment*, presents the design, development and the evaluation of a gamified assessment. The objective of the research is to describe how to gamify an assessment according to the gamification elements defined by Werbach and Hunter (2012). In order to design the gamified assessment, firstly, the dynamics were selected, then mechanics fitting the dynamics and then the components fitting the mechanics. All of these components were combined into a game board, leader board and a profile card that allow the learners to monitor their and others' achievements. The findings demonstrate that the gamified assessment elicited enjoyment, motivation, flow, learning, and lower exam anxiety.

The issue of assessment is faced by the next two papers that apply the **Evidence-Centred Design (ECD)** (Mislevy and Haertel, 2006) a framework for designing, producing, and delivering educational assessments to serious games aimed at acquisition of practical skills.

Also the paper by **Yasser Jaffal and Dieter Wloka**, entitled *Employing game analytics techniques in the psychometric measurement of game-based assessments with dynamic content* investigates if play metrics, and game analytics in general, can form the basis of measuring psychometric principles that evidence-centred design (ECD) uses to evaluate assessments, which are validity, reliability, comparability and fairness. In particular, the study describes how play metrics, also used to detect outliers which represent misuse of the game software, can be used to analyse players' performance in an open world 3D game for traffic education, called Bicycle World. The game targets 3rd and 4th grade students and aims at teaching the necessary bicycle traffic rules. The correlation between input metrics and performance metrics showed concerns about the validity of Bicycle World as assessment tool, if problematic sessions occur. If the game is used moderately a good reliability as assessment tool was registered.

The paper by **Nicola Capuano and Richard King** entitled *Knowledge-based assessment in serious games: an experience on emergency training* presents an immersive 3D serious game for evacuation training addressed to primary and secondary school students. The authors state that games can play a role in the assessment that may happen without interrupting the learner, observing and evaluating what he is doing. The main idea is to apply the Evidence Centred

Design (ECD) framework for evidence-based assessment where knowledge-based structures have been used to represent emergency skills and to relate them to possible user's actions within the game. In this way, all performed actions are evaluated by the system that provides immediate feedbacks and skill assessment is then used to automatically arrange micro-learning resources aimed at reinforcing missing skills to help users to reach better performances.

Finally the paper by **Sevasti Theodosiou** and **Ilias Karasavvidis**, entitled *Serious games design: A mapping of the problems novice game designers experience in designing games* to map out the difficulties teachers experience when tasked with the design of a serious game. The authors face on of the main problems in the field of Serious Game Design (SGD): linking educational design to game design. Indeed, when a Serious Game for educational purpose is designed, pedagogical experts should be actively involved, thus the participation of teachers in the process of SDG is promising as they are the ones to hold the instructional and pedagogical expertise. The paper contributes to this direction by examining the quality of designs of student teachers who attended an undergraduate course on game design.

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