SERIOUS GAME, GAMIFICATION, eLEARNING, AND SIMULATION

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CONTEXTUALIZATION
In the field of R&D we increasingly meet terms such as “serious games”, “gamification”, “simulation”, “eLearning” as they become more popular. As these terms share common domains of application, they can easily be mixed up it is therefore important to make distinctions between different practices.

THEME & OBJECTIVES
The purpose of this short paper is double: first, to propose a definition as short and simple as possible for each of the four terms and second, to emphasize common features and differences between them. The four concepts are illustrated in the figure.

**ELearning** concerns all online learning methods using an electronic device [1] such as training track distance education. Knowledge is often what is sought by users and is provided by databases or automatic systems (upper-left part of the figure). Not having a real professor nor teaching staff has the advantage of implying low costs for development and maintenance. Unfortunately, a large majority of current “e-Learning” software involved an interactivity reduced to the minimum, resulting in a lack of creativity, thinking, memorization, and questioning.

**Simulation** is a representation of a behavior or process in most cases related to any field like physics, biology or even economics or society (upper-right part of the figure). It usually reproduces real conditions with corresponding scales and measurement based on well-defined units, e.g. distance, weight or time. Real-time (that can be 60Hz or a day per frame) is frequently the main factor allowing the simulation rhythm [2].

**Gamification** is a recent and quite difficult term to define as even its origin makes debate; some say 2002, other 2008, furthermore, depending on whom
you ask, the definition might change. Gamification is the act of applying a layer of rewards to an activity (lower-right part of the figure), with the intention of making the activity more enticing and entertaining for its participants [3]. The reasoning behind it is that providing measurable and comparative feedback to perform an activity or action will motivate participants [4]. This term should not to be mixed with the process of transforming an activity into gameplay as gamification does not alter activities nor the way they are performed.

A Serious Game (SG) is before all a game, which has not as primary purpose the entertainment [5] but supports a serious purpose to train, search for or promote three possible cognitive levels: knowledge, skills or behaviors (lower-left part of the figure). SGs are often developed using computers and can be very similar to classic video games (which can strongly alter how we perceive the serious concept) or, on the contrary, have the appearance of simulation software. A SG being a game it has to follow its definition: games promote interactivity providing entertainment or amusement, with clear rules established before the beginning, and ending with a score or a threshold that almost always results into two possible states: losing or winning.

**COMMON FEATURES AND DIFFERENCES**

Here is a non-exhaustive list of properties that can help defining boundaries for each concept: eLearning is actually the only one that actually has to use computers, even if nowadays most simulations and SGs use it as main medium.
There are rarely feedbacks and virtually no interaction with eLearning whereas simulation and SG are essentially based on that notion. On the one hand simulations must be realistic as they represent a real phenomenon without alteration of its perception, resulting sometimes in a balance sheet. On the other hand SGs promote a “serious” purpose that must process a kind of entertainment and must end with success or failure. Intrinsic serious aspects have to remain intact but the process to reach the serious purpose and the appearance are often strongly altered. Gamification is a process that adds score (e.g. points) to an activity as a feedback purpose with respect to its properties in terms of the content and form.

A PRACTICAL EXAMPLE

It is not always easy to understand the difference especially when searching the best development strategy between Gamification and Serious Game. Here is a practical and simple example that might help concerning electricity savings extracted from a conversation with an expert in the domain (i.e. Dr. Björn Berg Marklund):

› A **gamified solution** would be to apply a score display over a light switch that shows how often the lights are kept off, the task of turning on or off the lights remains the same, but is “amplified” with a game-inspired element;

› A **serious games application** would be a game about light switches that highlights the effects and usefulness of electricity conservation. This principle hopefully should teach users the importance of being mindful of turning their lights off as much as possible.

This particular example is indeed a bit ironic, since running the game itself would be antithetical to its stated aims.

SHORT BIBLIOGRAPHY