

Chapter 4

Learning Systems and Gamification: Blending Augmented and Virtual Reality With Gamification Strategies

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ABSTRACT

Given the changes that have been recently felt and the transformation of the classroom from a physical space, with one teacher and a set of students, to a mediating platform through which learning and teaching are performed online, it is necessary to get acquainted with the contexts in which these platforms are implemented and how to use them, as well as with models and systems of e-learning, b-learning, or m-learning. While looking for solutions that allow to implement and use gamification for online learning, one also intends to get acquainted with (some of) these platforms, as well as to integrate and combine “new” technologies such as augmented reality and virtual reality with gamification strategies for e-learning. In order to do so, this chapter presents a systematized reading of the studies that was carried out on this particular subject and of what has been published on this theme.

INTRODUCTION

In the days that followed the closure of schools, teachers brought up many questions that can be divided in two major groups: those related to technology and those related to pedagogy. Many asked themselves: which platform to use? Which apps? What strategies? How to communicate online? How to keep students motivated? How to communicate content? How to assess? How to combine and integrate pedagogy and technology? Many of these questions are not new and teachers face them daily and, particularly in an online context, they tend to become more prominent.

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One of the major educational challenges that teachers face is to find methodologies and practices that are innovative and creative that allow students to significantly learn (Cleto, 2020). It is crucial to develop new methodologies that allow to engage students and to motivate them towards learning, by easing the process of understanding and, more importantly, by helping them to assume the responsibility for their own learning in the future (Gardner, 1993).

In order to do so, it is (also) necessary to engage and prepare teachers for that process (Cleto, 2020), by giving them training so that they can create and develop educational content that makes the learning/teaching process more effective, by making it more interesting and appealing, optimising the learning process in order to make the student the responsible for his/her own learning process (Gardner, 1993). These educational resources must be developed so that they allow the student to visualize, explore and handle the contents (Papert, 1993) in order to act upon the subject of study, while changing it, transforming it and understanding it (Appleton, 1993).

It is the school's role to be aware of the processes of change and it is fundamental that it increasingly transforms into a place in which students find their own space while acquiring a full and significant education (Cerqueira, Cleto, Moura, Sylla & Ferreira, 2020). Schools are expected to innovate and change paradigms and regardless of some resistance to change (Lagarto, 2013), some responses to the challenges that teachers and schools face have appeared, such as the flipped classroom format (Tucker, 2012; Mohan, 2018), which have been progressing side by side with the exploration of expanding mobile technologies (namely smartphones and tablets), as schools adopt (Cerqueira et al., 2020) Bring Your Own Device (BYOD) (Attewell, 2015), as well as Serious Games (Zyda, 2005) or gamification mechanics (Deterding, Dixon, Khaled, & Nacke, 2011).

Virtual environment technologies, Augmented Reality (AR) and Virtual Reality (VR) have also been gaining interest and recognition as an educational resource, for the great potential they present regarding their applicability and utility (Cerqueira et al., 2020), being potentially used in classrooms (Velev & Zlateva, 2017) as a complement to more traditional models (in traditional classrooms with aligned tables) or in modern models (as in flexible learning spaces). The use of Virtual Reality or Augmented Reality in the learning-teaching process implies the use of mobile apps, which allows to put cell phones at the service of education (Miguel, 2018), while taking advantage of those small computers that (most) students carry with them, turning them into teachers' powerful allies (Lagarto, 2013).

The growing increase of technological resources and the ease of communication changes the roles of teachers and students (Moura, 2012). It is the student and not the teacher who controls the process of learning (Bidarra & Figueiredo, 2016). Information is now available online, in an interactive and shared way, anywhere and anytime. Students are not mere users anymore and have become prosumers (Tapscot, 2009), reconfiguring and even producing and distributing content (Tapscot & Willimas, 2006; Tapscot, 2009), which is then shared, turning them into co-creators and co-authors (Zwick, Bonsu e Darmondy, 2008, p. 163-196; Ziemba, 2013; Ziemba e Eisenhardt, 2014) and producers of multimedia material, players in virtual environments, holders of updated information and tireless communicators in permanent mobility (Bidarra & Figueiredo, 2016).

This situation challenges schools and incites them to change and to include other models (e-learning, b-learning e m-learning) that allow students a higher level of participation, inside and outside classrooms and a process of learning based on challenges, problem solving and critical thinking (Moura, 2012).

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