

## Chapter 58

# Preparing for the Forthcoming Industrial Revolution: Beyond Virtual Worlds Technologies for Competence Development and Learning

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### ABSTRACT

*Virtual worlds (VW) propose an immersive environment and sophisticated infrastructure for active learning and complex competence development. While recently the interest toward VW declined, it is expected the release of virtual/augmented reality hardware equipment to bring new impulse for its further explorations in education. The present research aims to discuss the challenges behind VW implementation in the educational process from three main perspectives. First, there will be identified the main benefits of applying virtual worlds for knowledge acquisition and development of complex competences. The second perspective discovers how virtual worlds can be used to transform the educational process, developing a new set of learning and training experiences. Finally, virtual worlds will be analyzed from a disruptive technology point of view, discovering its strengths and limitations for education. At the end, the discussion provides a general framework for assessing the VW benefits for education and its expected further development.*

### INTRODUCTION

During the last decade, we witnessed the fast rise and fall of virtual worlds (VWs) and massive multiplayer online games (MMOGs). While in the beginning virtual worlds came with the promise to transform the overall Internet communication and collaboration patterns, few years later they remain an isolated experience. According to Gartner analysis, virtual worlds and virtual reality have stagnated for several years in the “Trough of Disillusionment,” and as a result, virtual reality has consistently remained 5 to 10 years from mainstream adoption (Gartner, 2015). The fall of VWs came with the financial and economic crisis (2007-2008) and the emergence of handheld devices and portables as smart phones, tablets

DOI: 10.4018/978-1-5225-5469-1.ch058

and portable devices (smart watches, smart glasses and others). The financial crisis reduced sharply the investment opportunities and imposed additional restrictions and cut-offs of the expenses for VW funding by companies, universities and R&D organizations. But more seriously, the recent wide spread of hand-held devices transformed the use of Internet and paved the way toward ubiquitous computing, relying on thin clients and cloud computing. Thus PC-centered and heavy three-dimensional graphic applications as VWs could not follow the trends, migrating to mobile applications. Just nowadays, with the emergence of new hardware solutions for augmented and virtual reality (AR/VR), along with new research in holograms and mixed realities bring VWs back under the lights.

Its worth to remain that in 2007 virtual worlds were very popular and millions of people have been connected to VW platforms. Huge investments in money and time have been made to build sophisticated VW applications for business, research, education, entertainment, healthcare, politics, art and even there have been established virtual embassies. VW came with new virtual economy, virtual goods and services and even virtual money, virtual meetings and virtual conferences. VW became an alternative way of bringing people together, not just replacing telephone calls and physical meetings, but providing new dimensions and richness of interactions. Virtual worlds became a way of self-expression, business opportunity and entertainment channel, as well as mode of life for millions. Even more, Gartner analysts predicted in 2007 that VWs would reach 80% of active Internet population by 2011 (Gartner, 2007).

Only few years later, virtual worlds and their universal application were fast forgotten. As discovered by some reports of Internet use, VW was one of the least popular Internet activities in 2010, used by less than 4% of all Internet users in USA (Zickuhr, 2010). In 2016, Internet live usage statistics show the wide dominance of social networks sites (SNS) used every second by millions of users (Facebook, Google+, Twitter), and the popularity of content sharing services as You Tube, Instagram and Skype<sup>1</sup>. Some real-time statistics of VW sites shows that no more than just 35 to 40 000 permanent users go there on daily basis (for Second Life®<sup>2</sup>). Thus, is it worth to turn back to the educational models of VWs? Will the implementation of virtual worlds in education remain an isolated experience from the first decade of 21st century?

In the advent of the Fourth Industrial revolution (WEP, 2016), when robots and automation systems will fast transform people's jobs, educational institutions and academia need to reshape the learning process in order to meet the new realms. Adopting new learning styles, learning methodologies and learning technologies is largely expected by students, by organizations and by the society as a whole. It is not just a single question of applying specific technological solution. We need a general new thinking of the logic behind the learning systems and the learning process. As Gregory, Lee, Dalgarno & Tynan (2016) point out, learning technologies are not innovations that intrinsically generate learning, rather they are just "catalysts," that when used well can enable engagement, active learning, authentic assessment and links between learning and life.

The process of knowledge acquisition and learning is determined by human cognitive processes or knowledge acquisition models. Therefore, the present research aims to discuss the phenomena of virtual worlds technologies application in education from three main perspectives. The first part will provide a short theoretical overview of knowledge acquisition models and learning, investigating how virtual worlds can improve mastering of competences, increasingly needed by new generations in the realms of forthcoming industrial revolution. The second perspective will discover what type of learning processes can be facilitated by virtual worlds. The third perspective will analyze evolution of disruptive technologies in education and how experiences in-world can be reshaped by new technologies as AR/VR, holograms and mixed reality. While virtual reality and virtual worlds are proposing many technological benefits

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