

## Chapter 12

# Games in Higher Education: Opportunities, Expectations, Challenges, and Results in Medical Education

**Cláudia Ribeiro**

*Technical University of Lisbon, Portugal*

**Sofia Corredoura**

*Centro Hospitalar Lisboa Ocidental, Portugal*

**Micaela Monteiro**

*Centro Hospitalar Lisboa Ocidental, Portugal*

**Fernanda Candeias**

*Stand Clear, Lda., Portugal*

**João Pereira**

*Technical University of Lisbon, Portugal*

### ABSTRACT

*Medical knowledge has increased exponentially in the last decades. Healthcare professionals face a lifetime challenge in keeping abreast with current medical education. Continuing Medical Education (CME) is an ongoing challenge. Traditional adult education, largely used in medical training, shows little effectiveness. Problem-based-learning has been proposed as a student-centred pedagogy to overcome failure of traditional medical instruction. In this chapter, the authors review the status quo of medical education, certification, and recertification in Europe. A summary of the history of simulation in medical education is presented. In recent years, there has been a growing interest in using video games for educational purposes. This is also true for medical education. The use of serious games in medical education is reviewed, and its integration in medical curricula is discussed. The efforts to raise awareness of policy makers are described. Finally, a critical assessment of the strengths and weaknesses of these technologies as well as a proposal to overcome some of its limitations are made.*

### INTRODUCTION

Given the far-reaching economic and political impact of healthcare policy, it is considered a priority sector by political decision makers worldwide. Medical knowledge is expanding quantitatively

and qualitatively. Healthcare professionals face a life-time challenge in keeping abreast with current medical education from what they learnt right from the beginning of medical school. Many of these professionals need practical experience without endangering themselves and others. This principle holds for many medical areas, such as medical

DOI: 10.4018/978-1-4666-3950-8.ch012

decision-making, behavioural training, and other areas involving dynamism and complexity.

Medical schools and residencies are currently facing a shift in their teaching paradigm. The increasing amount of medical information and research makes it difficult for medical education to stay current in its curriculum. Educators have faced these challenges by restructuring curricula, developing small-group sessions, and increasing self-directed learning and independent search. Nevertheless, it has been widely recognized that students have been ill prepared for their roles as young doctors. In addition to the well documented deficiencies in a range of skills, there have been reports of stress resulting from inadequate preparation for their roles. These skill deficiencies have occurred along a changing pattern of health care delivery, which has seen significant changes pertaining to the clinical experience of undergraduates. In the postgraduate arena, working time restrictions have raised concerns towards a more streamlined, shorter duration of higher professional training and also caused concern about the amount of direct clinical experience it is possible to provide.

In the light of decreasing time available for higher training, the case has been made for planned exposure to simulated cases to ensure that sufficient material is covered. The use of simulations is not new in medical education, in fact, it spans the centuries. Low-fidelity and high fidelity simulation is used across different areas of medical education to teach different levels of skills and as an evaluation tool to assess knowledge gaps. Another trend in medical education is Game-Based Learning (GBL). GBL is also expanding and in the last decade several research works have studied the impact of the application of such technologies in medicine and healthcare training and highlighted that GBL could provide new approaches and opportunities. However, most of this work is isolated and focuses on a particular problem with very little possibilities for generalization. This presents an important limitation

as medical procedures are reviewed/updated in relatively short time intervals which would result in making the games becoming obsolete very fast and thereby very costly to maintain.

In this chapter, we report the challenges in medical education, for continuing medical education for undergraduates and postgraduates. Also, a description of how certification and recertification works both in Europe and USA is provided. Certification and recertification presents both an opportunity and a challenge to the introduction of serious games in medical education. In part two of this chapter a summary of the history of simulation in medical education is described. This review ranges from the use of mannequin-based simulation to software and virtual reality based simulation. Next, we turn to serious games and its uses to promote both health education and also create awareness amongst policy makers.

A critical description of the current strengths and weaknesses of both, simulation and serious games, and a proposal to overcome these limitations are also presented. Towards the concluding part we point to the future scope for applicability and development in this area with potentially wide-ranging economic and social implications.

## **MEDICAL EDUCATION**

Society has changed dramatically in the last decades. Medicine is no exception. Medical knowledge has experienced an exponential growth. New diseases emerge and treatment is in permanent change with new drugs and treatment strategies being developed. Evidence-based state-of-the-art guidelines are updated every few years. For a student, what is current medical practice at the beginning of medical faculty may be completely obsolete when leaving it. Technology sets new standards in a vertiginous rhythm. Globalization is almost omnipresent and the Internet and its web 2.0 have changed the way people communicate, interact and perceive the world. As Prensky (Pren-

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