Chapter 13
SimBody:
An Interactive Simulator for Health Education

Bruno Vidal
Instituto Superior Tecnico, Portugal

João Madeiras Pereira
*Instituto de Engenharia de Sistemas e Computadores Investigacao e Desenvolvimento em Lisbao,
Instituto Superior Tecnico, Portugal*

Guilherme Santos
Zona Paradoxal, Portugal

ABSTRACT

Many of the top causes of death in the world are directly related to risk factors that can be avoided with changes in lifestyle behaviors. Computers with Internet access are widely available, and their multimedia capabilities show great potential for e-learning. Furthermore, most of the frequent Internet users already look for health related information online. This chapter presents an interactive simulator that educates people on how to mitigate the risk of cardiovascular diseases. The application is named SimBody and was initially developed in the context of a Master Thesis at Technical University of Lisbon (IST), in collaboration with ZPX, a multimedia software development company. SimBody allows the users to control the behaviors of an avatar. Besides showing the contribution of each decision towards the risk of cardiovascular diseases, it offers contextualized lifestyle advices and depicts the progression of atherosclerosis. After knowledge transmission tests, the majority of the participants stated that after using SimBody they are more aware of the dangers and intend to introduce changes to their lifestyle.

INTRODUCTION

For centuries, public health has been one of the main society concerns (Rosen 1993). Since the Industrial Revolution, Medicine evolved in many different areas. This improvement, combined with a change in life habits, led to a dramatic increase in the average life expectancy, all around the world.

In the past, better hygiene habits helped overcome the Black Death. In the present, we are faced with an equivalent challenge. The World Health Organization (WHO) stated in its 2008

report that chronic diseases like cardiovascular complications, cancer or diabetes are the cause of 60% of the deaths in the world. Many of these diseases are connected to obesity, another serious threat to global health. Most of them have one thing in common: risk factors directly related to habits and behaviors, such as smoking or having an unbalanced diet.

Many of the worst health problems of our society are directly related to controllable behaviors. People need to be educated and able to understand the actual risks in which they incur by keeping their dangerous habits. The information is available in many different forms, from pamphlets to TV ads, but, judging by the aforementioned number, the health education process needs to be reinvented, in order to become more effective and efficient. This means that the health education battle needs new weapons and interactive computer applications have great potential to assume that role.

Currently, society has absorbed information technologies into the quotidian life. The global access to computers and the Internet presents a great opportunity to reach citizens across the world. The Internet has emerged as one of the main sources of information (Seybert 2010), related to virtually any area of knowledge. Health is not an exception. According to data from the 2007 European survey on eHealth consumer trends (Andreassen 2007), a WHO project supported by the European Commission, 44% of the European citizens have used the Internet to search for health related information. That number corresponds to 71% of the frequent Internet users. Looking at the United States of America, those numbers are even higher: 56% and 79%, respectively. In Portugal, 30% of the population (62% of the Internet users) has looked for health content online (Santana 2007). These numbers show that people are interested and confirm the potential opportunity of using information technologies to educate society, promoting those much-needed changes in life habits.

From another perspective, personal computers and smartphones have rapidly evolved in the

last two decades and, today, even an entry-level device has great multimedia capabilities that can be explored to build powerful learning tools. These possibilities have sparked the Multimedia Learning research field, which dedicates itself to explore new ways to combine different media to provide more effective learning experiences. "One picture is worth more than a thousand words.", that is the common conception and, while not always true, several research studies have showed that combining text with images effectively leads to a better knowledge transmission (Mayer 2009). Furthermore, "For the things we have to learn before we can do them, we learn by doing them." Aristotle said, in a quote that summarizes the concept of learning by experience, which is constant in human life and has been studied and theoretically formalized by several researchers (Silberman 2007).

Interactive simulations and serious games promote the marriage between these two approaches, multimedia and experiential learning. This project described in this chapter aims to explore the promise of learning through interactive multimedia applications, applying them to one of humanity's educational priorities: health. In this context, the chapter also presents an interactive simulator that educates people on how to mitigate the risk of cardiovascular diseases. The application is named SimBody and is available for the web. Initially, this simulator was developed in the context of a Master's degree thesis at the Technical University of Lisbon (Vidal 2011), which resulted from a collaboration with ZPX – Zona Paradoxal, a software development company and multimedia content provider.

RELATED WORK

With the evolution of computer hardware and the advent of new computer graphics techniques, it became possible to create accurate visual representations of large quantities of data. Over the last

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