Chapter 4
First–Person Shooter Game Engines and Healthcare:
An Examination of the Current State of the Art and Future Potential

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ABSTRACT

First-person shooter (FPS) games have evolved from humble beginnings to what is currently considered the interactive entertainment genre most associated with state-of-the-art developments in gaming, particularly those of a technological and graphical nature. This chapter outlines and discusses past efforts, current usage of contemporary tools, and, finally, the significant suggested potential of first-person shooter gaming engines in the area of health, irrespective of whether these are targeted towards healthcare professional training, patient rehabilitation, or even raising awareness on key issues (to name but a few contemporary and/or suggested remits of the medium).

INTRODUCTION

Traditionally, FPS games have been associated with the willingness of their creators to provide community-oriented modification tools such as software development kits (SDKs), either through provision of the partial or full source code for the game engine they are reliant upon, or higher-level applications (such as level editors or scripting languages indirectly accessing the SDK of the engine). These tools and ethos have resulted in these engines being used for application development of a more "serious" nature and intent, mostly by hobbyists and researchers exploring the potential of the software but also, occasionally and notably more recently, professionals in the industry looking for off-the-shelf development platforms that are advanced enough in terms of visualization/interaction but also familiar to a large part of the public too (as console/PC/mobile gaming inevitably is in 2011).

Popular choices for this have been, first and foremost, Epic Games' Unreal engine (Epic Games, 2011a), which due to its particular busi-

ness model and also established position in the market place over the last ten years has had a great share of serious games, including ones in health, developed using it. Other propositions include Valve's Source (Valve, 2011a), and Crytek's more recent CryEngine (Crytek, 2011), to name but a few amongst the many offered. This chapter not only details and discusses past and current serious games in the area of health created/running on these and older engines, but also the prospects of forthcoming possibilities based on the impending developments of these tools (such as stereoscopic 3D capabilities, with more examples fully detailed in the Future Potential section later in this chapter).

CURRENT STATE OF THE ART

Efforts towards the implementation of gaming approaches within the healthcare sector can be traced back to before the term "serious game" entered widespread usage as a means to describe applications bearing familiar computer and video entertainment hallmarks, yet also a more purposeful, educational aim. Similarly to healthcare, which branches out to many fields, serious games themselves can be categorised in a number of various groups.

Serious games are in evident use today addressing issues in fields such as healthcare, education, military/defence, government operations, politics, city planning, and corporate and industrial processes, with an increasing overlap of these and many sub-categories beyond the scope of this chapter. Strictly speaking, as a genre, serious games can be traced back many centuries to basic board-game formats. However, accepting the definition of a serious game as a computer-based solution, a foremost area pioneering the use of video gaming for educational purposes has been the military sector. Examples include games such as DARWARS Ambush! (Raytheon BBN Technologies, 2011), a military training simulator and

America's Army (U.S. Army, 2011), originally intended as a marketing tool for U.S. army recruitment and notably one of the first serious games developed with the Unreal first-person shooter engine. Military serious games have paved the way forward for and remained a strong supporter of the medium to date and it is difficult to see this tendency reversing in the near future.

The other categories listed previously have also flourished, with the continued emergence of new titles as well as updates of established games improving on their efficacy; notable examples worth exploring as representative samples include the following: for corporate serious games IBM's INNOV8 BPM (IBM, 2011a), which tackles business process simulation for professionals; for government serious games FloodSim (Playgen, 2008), which addresses the complex flood policy decision-making; for educational serious games, possibly the most saturated area of all, partly a result of the obvious overlap with other fields, Supercharged! (Barnett et al, 2004) for teaching physics and specifically electromagnetism in a classroom environment; for politics serious games the Global Conflicts series (Serious Games Interactive, 2011); and, finally, for city planning serious games, IBM's CityOne (IBM, 2011b).

Whilst the purpose of this chapter is firmly concentrated on the discussion of what a specific part of a single gaming technology (first-person shooter engines) has, or can offer to healthcare, it is important to first offer a broader overview of general serious games in this area. Broadly speaking, healthcare video games can be categorised into two types: health education and medical education games. The differences between the two can vary from one title to the other, and can also often be blurred, but the most obvious distinction is the fact that the first group, health education, is aimed to be more accessible to the public, whereas the second group, medical education, is intended for training professionals. The following sections explore this distinction in more detail.

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