Chapter 1
Virtual Worlds in Healthcare:
Applications and Implications

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ABSTRACT

The merging of immersive technologies with gaming approaches has led to a raft of positive speculation about their future in medical education, in patient interventions, and in public involvement. In terms of delivery, however, the outcomes have been somewhat more muted. This chapter explores using case studies, why immersive virtual environments–so called Serious Virtual Worlds—are now being successfully developed and deployed for professional and wider use in healthcare. Whilst the chapter has a wide focus, specific attention is given to the application of virtual worlds in clinical practice, demonstrating that when combined with patient data models it is possible to deliver real time immersive clinical training experiences in a range of contexts. Finally, it argues that due to their rapid development and deployment cycle and associated low costs, serious virtual worlds, once accepted, will have a substantial impact in healthcare.

1. INTRODUCTION

Whilst building, custom Serious Games are one approach in healthcare; this chapter takes a different and more pragmatic approach. Rather than building a unique and proprietary game application to solve a specific healthcare problem, how can we use existing multiplayer immersive technologies to deliver change in healthcare? Given that these technologies are now readily available in the market, having been developed by the commercial consumer gaming industry (KZero, 2011), then it would seem to make sense that they should be explored and possibly exploited for use in healthcare. This is because their original massive development costs have already been expensed in the commercial market and the resulting development platforms and, as importantly developer

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skill sets, are available at a fraction of the cost compared to building an equivalent proprietary immersive environment for use in healthcare.

The merging of immersive technologies with gaming approaches has led to a raft of positive speculation about their future in medical education, in patient interventions, and in public involvement (Kamel Boulos, 2011). This chapter explores using case studies, why immersive virtual environments–often called Virtual Worlds-are now being successfully developed and deployed for professional and wider use in healthcare. Whilst the chapter has a wide focus, specific attention is given to the application of virtual worlds in clinical practice, demonstrating that when combined with patient data models it is possible to deliver real time immersive clinical educational experiences in a range of contexts. Finally, it argues that due to their rapid development and deployment cycle and associated relative lower cost of content and scenario development, virtual worlds, once accepted, will have a substantial impact in healthcare. So, what are virtual worlds and why and where are they being deployed in healthcare?

The most compact definition available is: "A synchronous, persistent network of people, represented as avatars, facilitated by networked computers" (Bell, 2008). The key elements of this definition are that a virtual world operates in real time, exists whether participants are in the world or not, is a social space in which people are digitally represented and so can interact, and is underpinned by networked computers that manage the world and its interactions. Where a virtual world is developed and deployed for professional purposes then they can be called 'Serious Virtual Worlds'–a term originally coined by one of the authors of this chapter for the Serious Virtual World conference series between 2007 and 2009 (DD) and subsequently used in a substantial UK study(Di Freitas,2008). Serious Virtual Worlds are 3D virtual environments which users inhabit and interact for discussion, learning and conducting activities of educational or professional interest.

The positioning of virtual worlds vs. serious games can be seen in Figure 1, which, on a two pole axis showing immersion and numbers of users, places Serious Virtual Worlds in the highly immersive, highly social quadrant. This positioning vs. Serious Games will be revisited and addressed later in the chapter.

Of course, there is the more general question of why should we be deploying immersive gaming technologies – virtual worlds - in healthcare at all? What are the drivers, if any, that will result in their adoption and acceptance? Simulation has been used in healthcare education since its inception. Whether practicing on other medics or on static medical dummies, simulation has been embedded in medical practice. The arrival of low cost computing power together with accessible visualisation technologies and universal access to cheap broadband networks, as in other domains, is changing the landscape of the possible. This technological backdrop, when combined with changes in healthcare: the increased tempo of medical change; constrained budgets; introduction of new and sophisticated medical equipment; diminishing training times, it is these multiple factors that are leading to a rising interest in simulation by healthcare professionals (GSNH, 2011).

In addition, as this chapter will show, the context in which medical care is provided is a crucial factor. Context, in this case, has two key elements: firstly, in the area of collaboration as much medical care is provided by teams, and secondly, in the conditions under which care is delivered which has been shown to be critical determinate in delivery and outcomes (Lee, 2007).

Finally, for those healthcare professionals whose interest in simulation has been stimulated elsewhere, the ready availability of COTS (Commercial-off-the-shelf) virtual world platforms, many of them 'free,' is leading to a range of experimental deployments of serious virtual worlds for healthcare, some of which are explored in this chapter.