

## Book Review: *Serious Games for Healthcare: Applications and Implications*

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***Serious Games for Healthcare: Applications and Implications* by S. Arnab, I. Dunwell, and K. Debattista. IGI Global, London, 2012. ISBN-10: 1466619031.**

**T**HE VIDEOGAME INDUSTRY has continued its growth into a multibillion-dollar business over the past 30 years, outpacing that of the movie and music industries. In the past decade, substantial work has been committed to videogame development and research for education, social change, and health. To many people, expressions such as “serious games” no longer sound novel. However, few books on serious games have specifically focused on games that are health care-related. *Serious Games for Healthcare: Applications and Implications*, released in the summer of 2013, offers a much-needed platform for people interested in this topic.

The book consists of 14 chapters. The targeted audiences include academic and industrial researchers, game professionals and developers, and health and social services professionals who would like to understand the design, development, and deployment of videogames in healthcare settings, as well as the trends and commercial potential of these games. Accordingly, the chapters are arranged in three sections.

Section I covers key trends in serious games for healthcare. Chapter 1 showcases the potential of immersive virtual environments, also known as serious virtual environments. Although the virtual world focuses less on gaming, it serves an alternative or complementary technology platform to serious games due to its relatively faster development and deployment cycle, and lower cost. Chapter 2 focuses on the use of metaphor in serious game design. Metaphor, according to the authors, refers to “the substitution of a game universe for a context of reference, in which it is possible to use fantasy and abstraction to motivate or immerse the player” (p. 26). Although metaphors would be helpful to transfer the health message to the public, health professionals would benefit more from a direct approach (featuring a realistic hospital setting instead of a fantasy world of magic). Chapter 3 explores the use of games for rehabilitation and recovery purposes. Games provide engaging environments with

motivational features such as entertainment value, outcome measurement objectivity, and personalized treatment for the player. This section concludes with a review of modern game engines (Chapter 4) typically used for first-person-shooter games and discusses their suitability and applicability to healthcare training. These game engines can help to create rapid, efficient technologies for creating high-fidelity, interactive environments within a healthcare context.

Section II focuses on serious games’ design and development. Chapter 5 surveys a range of ethical considerations unique to games for health care and discusses their implications. Although the industry lacks guidelines for ethics in healthcare game design, this chapter provides a useful summary of the key considerations in ensuring ethical design and future research directions. Chapter 6 discusses rehabilitation for stroke patients. This chapter emphasizes the importance of creating appropriate levels of challenge to meet the participants’ needs while maintaining sufficient interest levels. It presents a user study featuring a game that can dynamically adjust the difficulty levels. Chapter 7 discusses an intervention mapping approach for the design of a serious game for sex education. This approach uses structures and detailed planning to ensure that the resulting intervention is based on the participants’ needs, informed by theory and evidence, and sensitive to the contextual climate in which it will be used. Chapter 8 reviews the status of current nutrition games and research and refers to applicable resources on this topic. There is a dire need for nutrition education assistance and help to alleviate the obesity epidemic. Besides nutrition education, physical activity is a key factor in obesity prevention. Chapter 9 expands the scope to exercise and provides a comprehensive review of research on the potential and the limitations of exergames. It also raises several key issues to be addressed for future exergaming research. The last chapter of this section (Chapter 10) shifts the focus from games back to researchers. It offers an insightful perspective into the issues of working within a research team to effectively design and evaluate health games. It also covers issues of safety and ethics in the health game research process.

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Section III illustrates four established case studies of serious game application in healthcare settings. Chapter 11 addresses infection control efforts on hospital wards with on-site training in the form of a serious game called "Ward Off Infection." Despite over 75 percent of the targeted nursing population playing games on a regular basis according to a preliminary survey, the use of serious games by the nurses was significantly lower than expected. The next chapter explores the development of "Kiddio," a smartphone video-game application, to help parents to effectively get their preschool children to taste vegetables. It is the first game of its kind with theory-based behavior change procedures to maximize the health outcome. Chapter 13 presents a serious game called "Simbody" that educates users on how to mitigate the risk of cardiovascular diseases. It also demonstrates how serious games can be alternative tools for health behavior promotion. The final chapter describes a serious learning game called "Medicina," which assists nurses who are not native English speakers to improve their language knowledge. Playing the game resulted in a significant improvement in participants' phonological awareness.

The propagation of health technology has increased the potential of serious games' reach and influence across the continents. Most of the game cases and research teams in the book, however, are based in Europe, with a few exceptions in the United States and Australia. Because the health issues and behaviors discussed, such as chronic noncommunicable diseases, are global problems, serious games research could be broadened into a more international scope. The extent to which healthcare games need to be culture-specific to maximize effective outcome needs to be addressed.

Although it has become a general assumption that serious games could and should be a widely accepted medium to drive improvements in healthcare, most of the research teams

in this book, interestingly, work independently of each other without cross citations. This gap may be related to the "relative infancy of game-based learning approaches when contrasted to more conventional pedagogies" (p. xx of Preface). Another factor may be the diverse nature of the academic and industry backgrounds of the research teams. Going forward, expansion of serious games research across disciplines should help to foster interdisciplinary conversations as well as references.

Despite the fact that promising results have been reported in preliminary studies, most of the discussion on serious games has not explored the mechanism(s) of the influence. Indeed, the novel nature of the videogames would make direct adoption of existing psychological, behavioral, and learning theories difficult. Innovative interdisciplinary approaches and perspectives are dearly needed. The explication and examination of potential mechanism factors could be the focus of the next generation of serious game design and research.

Overall, this book serves as a timely survey of serious games developed for healthcare with content for a wide range of readers. Various methods, theories, approaches, evaluation designs, and reflections, with respect to the past, present, and future of serious games, are covered in this book, which helps to shed innovative light on the evolution and revolution of modern health care.

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