Chapter 10
Activity–Based Scenario Design, Development, and Assessment in Serious Games

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ABSTRACT

Serious gaming environments provide the potential to create player activities and opportunities to design for experience. A flexible, powerful and rich way to create, represent and characterize player activities in serious games is through scenarios. Scenarios are stories: they are realized through text descriptions and supporting artwork such as storyboards and sketches. In this way, they illustrate a game’s scenes, settings, circumstances and situations, as well as the possible future sequence or choice of events that make up a game’s narrative flow. While the flexibility of scenarios makes them useful for describing player activities, the lack of tools and methodologies to guide their design may lead to the use of ad hoc non-standardized language. Borrowing from film, HCI, and activity theory, this chapter describes a hierarchical activity-based framework that on the one hand is sufficiently flexible to support the design and development of scenarios at any level of complexity, while on the other hand provides a standard template and language with which to frame scenarios in serious game design. The proposed framework provides a way to bridge the gaps between design, development, and implementation of serious games. In addition, it incorporates a multi-level structure providing multiple units of analysis (a variable lens) for analyzing learning from objectives to goals and subgoals.

INTRODUCTION

Although users have been interacting with computer and video games for decades, published work on gaming in the literature of human-computer interaction (HCI) has been limited until recently. Despite this lack of research, the computer games industry has become one of the most lucrative technological and media industries, raising questions about whether the HCI community really has anything to offer the industry in terms of the advancement of games development. What HCI can provide, how-
ever, is a research base to inform design theories and methodologies to guide design and evaluation of games and player experience. Over time, methods become validated through extensive trial and testing, leading to wider use and standardization. Another sector that would arguably gain from this is simulation and game-based learning. This is because the development of validated and standardized evaluation and design methodologies opens opportunities to create digital games for learning based on sound design principles and pedagogical theories, integrate learning objectives, help design for anticipated outcomes, and incorporate or develop valid techniques for the assessment of learning. In addition, standardized and validated evaluation and design methodologies can inform researchers and educators as they develop their own games and strive to assess the learning that results.

It has been widely touted that the engaging and motivational aspects of video games can be incorporated with educational components to transform the way people learn and make learning more enjoyable. It is because of this that many sectors and organizations from business, health, military, and education the world over are considering the potential of serious games to support learning and to complement existing teaching materials and resources. Despite the fact that advocates of serious games and game-based learning now have the world’s attention, there remains little in the way of standardized tools and approaches for assessment of learning in serious games (Chen & Michael, 2005) and little in the way of design guidelines that embrace “well-established and practical instructional theories” and “good game design principles” (Gunter, Kenny, & Vick, 2006). To overcome this, several researchers have argued for taking game-based learning more ‘seriously.’ For example, Zyda (2007) suggests a need for “creating a science of games,” Van Eck (2007) argues for a more rigorous research approach with game-based learning, and Marsh (2007) calls for “serious approaches and methodologies for serious games.” While some propose “design dimensions” (Hendriksen, 2006) and “formal design principles,” incorporating learning theories (Gunter et al., 2006) for serious games, is largely theoretical work rather than operationalized, applied, and tested research.

Recently we have witnessed an increase in published serious games literature outside of HCI. However, rather than pursuing a complementary research and development approach, much of this work focuses on development alone. Generally this involves building ad-hoc games for a specific purpose or situation, paying little attention to research that can go towards the creation of tried and tested design guidelines or tools supporting underlying theories of learning to demonstrate a game’s learning or educational value or how it can generalize to a wide range of serious games learning environments.

Serious games provide designers and developers with opportunities to create activities for players and the potential to design for experience. Activities in serious games are for purposes other than, but also including, entertainment. An increasing array of categories are used to encapsulate emerging purposes for serious games (e.g., learning, training, education, health, well-being, for change, persuasion, experiential). Specifically, purpose in a serious game is achieved by undertaking a number of actions in order to reach or fulfill the serious game’s objective. A flexible, powerful and rich way to represent actions in serious games is through story, narrative or scenario. While such approaches imply a narratological approach to tell a story (Crawford, 2004) and engage the player (Murray, 1997), it is also argued that they can incorporate rules (i.e., ludology, where mastery of rules leads to player engagement, Juul, 2005) or that at least narrative and rules can coexist side-by-side in a game.

This chapter describes a framework that addresses important challenges facing serious games development; namely, the creation of scenarios in such a way as to also allow assessment of learn-
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