Chapter 52
Using Serious Games and Building Models:
Two Complementary Steps in the Learning Process

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ABSTRACT

Technology currently allows the development of games that can be used not only for entertainment purposes, but also for training. This can be especially suitable in the case of training for business managers. In fact, there is a long tradition of using games for training in management issues. This chapter presents a general review of the value added by the serious games use in the case of management training and particularly visits the experience of using games based on systems dynamics simulation models. The focus of this type of games is oriented towards making explicit the structure underlying the behaviour simulated in the game. Finally, a real training case is presented in detail, where both methods, serious games and system dynamics, are combined for gaining a deep insight in maintenance techniques.

INTRODUCTION

People who were born before the last decade of 20th century used to play as their parents did. This has been true for many generations; that is, during centuries the way a generation played and the way the next generation played was very similar. But this has drastically changed these last two decades. The way our children play is very different from the one we played. In addition to the more traditional toys and games, which still can generate nice pleasure times, children can also use technological devices which have exponentially increased the playing capabilities.

But although the playing alternatives have evolved, there is no doubt that the most effective way of learning has always been and still is by playing. Reading from a book, assisting to classes, doing exercises, all of them are learning methods; but playing includes some elements that make it the most efficient one.

As a consequence, adults still need to observe how children play (and learn) using modern technological tools, which allow functionalities significantly more sophisticated that the ones of traditional learning methods. So we are still trying to understand how these technological devices can be used within serious games, helping not only children and young people to learn, but also adults.

This proliferation of products designed to play and learn means that opportunities for learning by playing have never been greater. At this point, we should explicitly mention which are the differences among games, video games and serious games. One classification used for this purpose can be the one provided by Zyda (2005):

- Game: "A physical or mental contest, played according to specific rules, with the goal of amusing or rewarding the participant."
- Video Game: "A mental contest, played with a computer according to certain rules for amusement, recreation, or winning a stake."
- Serious Game: "A mental contest, played with a computer in accordance with specific rules that uses entertainment to further government or corporate training, education, health, public policy, and strategic communication objectives."

This paper presents the characteristics and advantages of using serious games applied to management courses. For this purpose it analyzes the characteristics that make serious games especially suitable for management training, the antecedents of the use of serious games for the education of managers, and presents System Dynamics, a modelling methodology (Forrester (1961), Coyle (1996), Sterman (2000)), which could strength the results of using serious games. Additionally it presents a deep analysis of a case where both tools (serious games and System Dynamics) are taught to industrial management students.

SERIOUS GAMES APPLIED TO MANAGEMENT TRAINING

Serious games can and have been applied to several training subjects; though this paper focuses on their use in the business management training. There are several reasons that foster the use of serious games during the training activities of business managers.

- Currently, managers expend a very significant part of their work time in front of their computers. This means that "playing" a serious game in a computer or any other technological device is a very realistic experience for them. If the serious game interface is similar to the one of their real work environment, making realistic the experience of looking to the "simulated" information coming from the serious game, making decisions and observing the consequences of these decisions is an easily achievable goal for the serious games.
- In the case of students, serious games are not only useful for training them about a specific subject, but also to make them familiar with the information environments they will use for making their decisions.
- The access to information for decision making can be controlled by the game. This means that different experiment can be developed, providing to decision makers different options, regarding the information they can access. Additionally the possibility of generating realistic reports,

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