

Chapter 5

Playability Design Patterns: An Approach to Facilitate the Design of Educational Video Games

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ABSTRACT

Learning through play is currently an effective and attractive educational strategy. Recently, many educational video games have failed because methods of analysis have not been used to discuss playability level in a structured way. Ensuring a good player experience characterized by playability requires cooperation and collaboration between game designers and educators. To this end, the authors have proposed a new set of patterns to support educational video game design and analysis. These patterns aim to facilitate the development of educational video games, summarize the essential information and requirements needed to understand a particular problem and the proposed solution, and present the interrelationships between educational video game components and playability attributes.

INTRODUCTION

The field of Educational Video Games (EVGs) is unique, with different objectives, designs, and forms of presentation, which distinguish it from other kinds of video games and which vary according to the requirements of the user. EVGs

are a combination of two components that are different in nature: learning and playful. This multidisciplinary nature of EVGs makes them difficult to design and implement. EVGs are a wonderful way to promote enjoyable learning, and there are currently many on the market. However, are all EVGs successful and do they always keep the player interested and motivated? Here, we emphasize that the success of an EVG depends

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on the fun a player has while learning. From our point of view, this requires an implicit learning process and an innovative approach, which effectively integrates and balances fun challenges with the educational objectives. Accordingly, it involves providing attractive aspects that traditional methods of teaching cannot offer, so that while students play an EVG they are learning without even realizing it.

Unfortunately, one important issue that no existing educational video game methodology addresses is: how to create good, effective designs from the point of view of playability and player experience, which are very important for EVGs. This is the challenge that successful, experienced games designers face. To overcome the problem we propose the use of design patterns as an effective model to support the design and analysis of EVGs so that the video game experience and the efficiency of the learning process may be improved. Design patterns originated as a way to democratize design knowledge, by exposing the timeless principles at the heart of expert knowledge and making them accessible to all. Design patterns help to develop better games, and are good tools for recording and reutilizing design experience, providing the explanation and evaluation of important and recurrent designs. Using design patterns in EVG provides us with the ability to describe the interaction between the EVG components and the use of these components by the player to affect EVG Playability.

In this chapter, we present the way in which design patterns support Player Experience based on playability characteristics of EVGs, and how they help video game designers to combine and focus their game ideas. We have developed a collection of design patterns that describe solutions to reoccurring educational playability problems in EVGs. Our patterns have been collected from the analysis of existing educational video games. Our proposal gathers together whatever is suitable and useful for EVG design patterns from a set of works that relate to different video game

genres, interactive systems, hypermedia systems and multimedia systems. Furthermore, we have introduced a taxonomy for grouping the proposed patterns into a flexible, interactive structure related to EVG elements, which makes it easy to select an appropriate pattern for a specific EVG problem.

Design Patterns: Related Works

Design patterns have been suggested as a shared language of design experience. The idea of design patterns originated with the work of the architect Christopher Alexander (Alexander, et al., 1977). It was done with the explicit aim of externalizing knowledge to allow the accumulation and generalization of solutions and to allow all members of a community or design group to participate in the discussion relating to the design. As such, design patterns can be seen as a methodological tool to support the creation of an explicit design language. In general, a design pattern is defined as a high-level specification for solving a problem during the design phase.

Alexander describes patterns as being not merely informal guidelines, but a formalized arena of discourse. Once a pattern is identified and formalized, it can be easily referenced by domain experts and objectively compared to other formalized patterns in its ability to satisfy design goals. Alexander described design patterns as a formal design tool for use in the field of architecture in the book *A Pattern Language* (Alexander, et al., 1977). In it, he wrote the sentence that would prove to be the foundation for the entire use of design patterns in software development in the decades to come:

Each pattern describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice.

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