

Chapter 7

Game-Based Learning Design Patterns: An Approach to Support the Development of “Better” Educational Games

Manuel Ecker

University of Education Weingarten, Germany

Wolfgang Müller

University of Education Weingarten, Germany

Johannes Zylka

University of Education Weingarten, Germany

ABSTRACT

The application of computer games in the field of learning has gained increasing interest lately. Research in this area has been enforced and more, and more computer games have appeared on the market. However, only a few of these educational games can convince and fulfill the high expectations. A major reason for this is that it is not easy to integrate game play with learning elements without interfering both in a negative way.

This chapter introduces an approach to use best-practice experiences in terms of Design Patterns to support the development of high-quality and successful educational games. These Game-based Learning Design Patterns draw from previous work on Game Design Patterns and Pedagogical Patterns. The chapter provides background on the Design Pattern approach and explains the structure of the new pattern type based on selected examples. It also illustrates that existing patterns, e.g., from Game Design, may provide first evidence, while the identification of Game-based Learning Design Patterns is not straightforward.

DOI: 10.4018/978-1-60960-495-0.ch007

INTRODUCTION

Since Marc Prensky introduced the term Game-based Learning (Prensky, 2001), the development and application of computer games has received increasing interest, and a number of quite successful examples of learning games and serious games have been introduced (for a more detailed classification of these genres cf. Tang, 2009). The idea to utilize the highly motivating aspects of games and the inherent possibility to create situated learning contexts, and even the potential to initiate stealth learning is indeed fascinating. Yet, progress in this field isn't actually satisfying. The vast majority of learning games does not match the high expectations (cf. Jantke, 2006; for a recent comprehensive study Ritterfeld, 2009; and for a detailed analysis of specific examples Weiß, 2008). In fact, it has been argued that the same problems can be found in edutainment titles since the 1980s (Egenfeldt-Nielsen, 2008).

Still the question, how the development of educational games can be supported and the quality of content and design can be increased, remains. In this chapter we describe the approach of collecting best practices in this field in terms of so called Game-based Learning Design Patterns (GBLDPs). Those patterns support authors developing Game-based Learning applications and may probably improve the quality and educational integration in teaching and learning scenarios. We provide some background on Design Patterns and their application to combine know-how and best practices, as well as on the application of Design Pattern approaches in both, the domain of computer games and in the educational field. Based on existing approaches in these domains we describe and discuss a structure for GBLDPs. Moreover, we provide three examples for such patterns and their description utilizing the proposed structure as well as we discuss challenges in identifying and recording adequate patterns and best practices in the field of Game-based Learning which may be caused by the wide spectrum of possible applica-

tions of educational games and the corresponding instructional decisions.

BACKGROUND

The Design Patterns Approach: Theory and History

The introduction of Design Patterns and the notion of a pattern language can be attributed to the architect Christopher Alexander (cf. Alexander, 1977). Alexander's main motivation was actually to provide a toolbox containing solutions to common problems that designers face when designing and creating buildings and cities. The result was a document of established solutions and common knowledge in architectural design in the form of a collection of patterns. Alexander pictured this collection as a language – a pattern language –, which combines elements following certain rules.

Later, Alexander's concept of Design Patterns was successfully adapted to the domain of software development (Gamma et al., 1995), providing a means to describe best practices in software design in a structured and well-defined way. Today, the Design Pattern approach is well accepted and is widely applied to identify and describe solutions for design problems in a semi-formal way. Well-known examples relate to fields such as human-computer interaction (cf., e.g., Borchers, 2001; Tidwell, 2005; or Schümmer and Lukosch, 2007), web programming (cf., e.g., Wallace, 2000; and Vora, 2009) and others.

Design Patterns have also been proposed in the field of computer games as an approach to document best practices. Björk and Holopainen (2005) presented a collection of patterns in Game Design, describing elements of and approaches to computer games that can be found regularly. The focus of this pattern collection is clearly on the gameplay as a core aspect of computer games, examples for named Game Design Patterns are Role Playing, Social Dilemma, Exploration or

14 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:
www.igi-global.com/chapter/game-based-learning-design-patterns/52493

Related Content

"Like Hearing From Them in the Past": The Cognitive-Affective Model of Historical Empathy in Videogame Play

Liz Owens Boltz (2017). *International Journal of Gaming and Computer-Mediated Simulations* (pp. 1-18).
www.irma-international.org/article/like-hearing-from-them-in-the-past/193879

The Applicability of Gaming Elements to Early Childhood Education

Holly Tootelland Alison Freeman (2014). *Gamification for Human Factors Integration: Social, Education, and Psychological Issues* (pp. 225-241).
www.irma-international.org/chapter/the-applicability-of-gaming-elements-to-early-childhood-education/96034

A Next Gen Interface for Embodied Learning: SMALLab and the Geological Layer Cake

David Birchfieldand Mina Johnson-Glenberg (2010). *International Journal of Gaming and Computer-Mediated Simulations* (pp. 49-58).
www.irma-international.org/article/next-gen-interface-embodied-learning/40939

Rhetoric of Game: Utilizing the Game of Tavistock Method on Organizational Politics Training

Ben Tran (2014). *Cases on the Societal Effects of Persuasive Games* (pp. 145-174).
www.irma-international.org/chapter/rhetoric-of-game/113486

Toward Broader Definitions of "Video Games": Shifts in Narrative, Player Goals, Subject Matter, and Digital Play Environments

Lucas John Jensen, Daisiane Barretoand Keri Duncan Valentine (2016). *Examining the Evolution of Gaming and Its Impact on Social, Cultural, and Political Perspectives* (pp. 1-37).
www.irma-international.org/chapter/toward-broader-definitions-of-video-games/157614