Chapter 38
The Three Dimensions of Flexibility in the GameTel Project

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ABSTRACT

The employment of serious games in educational settings is a hot research topic nowadays. Many research results from a few different research fields are quite promising, and Game Based Learning is thus gaining momentum. This chapter presents the GameTel project, carried out (among other partners) by the University of Vigo, aiming to develop a software system that enables the composition of lesson plans that include serious games. The main focus in GameTel is placed in the flexibility: users may access the GameTel platform to play/learn from different devices (the computer and the digital television so far); the GameTel platform may adapt to different users who have different backgrounds and preferences; and GameTel may integrate different externally hosted games that are online all over the Internet. This chapter goes through these issues, and describes the solutions adopted in GameTel.

INTRODUCTION

The current dissemination of broadband connections, along with their reduced price and their good performance, has changed the way we use the Internet. Some years ago, the web was just a mere collection of static pages with hyperlinks between each other. Nowadays, it has evolved into a huge platform comprising data in many formats, and tools required for managing and sharing. Among this broad variety of tools it is possible to find games that can be played with no additional software other than the browser.

Games have been envisaged as a promising way to face online learning, as they provide important

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advantages such as an increase in the motivation of learners, personalization, rich media experiences, collaboration and practice (Clark, 2006). In view of this situation, the GameTel project (GameTel Consortium, 2010) (led by a group of partners including the University of Vigo) has been launched with the aim of exploring the possibilities of gaming in collaborative learning environments. To this end, GameTel provides a framework to support the design, development, deployment, and evaluation of educative games and simulations adapted to a wide range of learner characteristics, such as formative itinerary, user profile, learning objectives, personal preferences, and feedback.

The main challenge faced in GameTel is to provide an architectural approach to integrate external serious games in collaborative lesson plans. The current panorama of serious games is composed of a plethora of different stand-alone resources scattered all over the Internet. Each serious game is targeted to a particular audience, with a particular background, language, experience, age, etc. The GameTel model allows for integrating different externally hosted serious games into a lesson plan, following a model-oriented approach. Thus, course authors can use a graphical authoring tool to create the lesson plans, into which the external serious games can be included.

The ultimate goal of GameTel is provide a personalized learning experience based in serious games. To this end, GameTel has adopted an architectural approach based in PoEML (Perspective-oriented Educational Modelling Language) (Caeiro-Rodriguez, Marcelino, Llamas-Nistal, Anido-Rifon, & Mendes, 2007), which, basically proposed a three-dimensional approach to flexibility:

- Dimension one is the adaptability to the access device.
- Dimension two is the adaptability of the lesson plans.
- Dimension three is the adaptability of external apps themselves.

In this chapter we start with a revision of the current state of the art of adaptive learning plans that are based in serious games. We follow with the presentation of the motivation and objectives of the GameTel project. Next, we introduce the architectural approach based in PoEML that aims at supporting the maximum level of flexibility. The following section is devoted to explain how the presented architecture is optimal to support the maximum degree of flexibility. We continue with a description of the implementation of the GameTel Learning Management System (LMS). Finally, the chapter ends with some conclusions and future work.

BACKGROUND AND RELATED WORK

Works Related to the Adaptability to the Device Used for Accessing E-Learning Platforms

A majority of approaches to the independence of the device that is used for accessing to a software platform are based in the Service Oriented paradigm. This architectural pattern presents some advantages:

- The SOAP protocol works over HTTP, thus overcoming possible firewalls.
- There exist frameworks to publish and consume Web Services in almost every programming language.
- The Service Oriented paradigm allows for exposing the functionality provided by a software system as a well defined interface.

The Service Oriented paradigm is thus a convenient way to expose the core services provided by an e-learning platform, uncoupling the man-