Zeus – A tool for generating rule-based serious games with gamification techniques

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Abstract: Gamification refers to the use of rules and game design techniques to involve and motivate people to achieve their goals. This work proposes an application development architecture that can generate game applications with gamification techniques. As a proof of concept, we introduce Zeus, a platform for developing ruled-based serious game applications with gamification techniques. Zeus aims at generating gamified applications that can meet the learning goals set by users. These goals will be reflected through both learning and game attributes that users can personally select. To assess the functionality of our tool, we conduct a qualitative evaluation of four rule-based serious game applications developed with Zeus to help students learn about arithmetic. We make use of the Fun Toolkit to perform this evaluation in terms of the delivery of both fun and learning experiences. Our findings are encouraging in the context of learning basic arithmetic operations with Zeus game applications.

1. Introduction

Gamification refers to "the use of game design elements in non-game contexts," [1] and its goals are "to influence behaviour, improve motivation and enhance engagement" [2]. Gamification can take several forms, from the layering of basic game mechanics onto routine performance tracking, to the full integration of productive tasks into a virtual gaming environment [3]. Recently, gamification has been adopted in a variety of areas, including business, science, and last but not least, training and education. Although the benefits of gamification can be exploited even in a traditional teaching process [4], they are particularly helpful in online teaching and learning [5].

Implementing gamification means adopting game-based rules that are often complex; hence, it is usually much more practical to use software at least to track learner achievements, make necessary calculations, and trigger relevant feedback, rather than having instructors manage all these tasks. From this perspective, e-learning platforms create a perfect opportunity for implementing gamification techniques, since instructors and learners are often familiar with them; moreover, these platforms have progress tracking capabilities. They only lack gamification mechanisms.

E-learning platforms are also friendly and intuitive, which allows users to easily and quickly generate educational games with gamification techniques. Furthermore, the generated games can combine learning activities and games attributes; in order words, they can be serious games. A serious game is a "computer application whose original intention is to consistently combine serious aspects (such as non-exhaustive and non-exclusive, teaching, learning, communication, or information) with playful elements taken from the video game" [6].

The motivation to develop a Web-based application is allowing to any type of user generate educational games by implementing gamification techniques in a quick and easy way. The generated educational applications can combine learning activities and games attributes. In the development of the Zeus platform, the teachers were considered as users; our motivation was to provide teachers with a tool that allows them to develop innovative educational material such as educational applications with gamification techniques using new learning techniques. Through the Zeus platform teachers can develop rule-based serious games with gamification techniques to help their students in the teaching-learning process from a new approach such as learning based on games. The minimum technical skills required for teachers to use the Zeus platform are those related to the basic concepts of web browsers and the web (for example: web browsing, web addresses and hyperlinks). It is important that the teacher is familiar with the use of websites so he can follow the steps of the platform to generate rule-based serious games with gamification techniques. The Zeus user interface is simple and easy to use; itrequires only data related to the content of the game. Therefore, it is not necessary for the teacher to have knowledge of software development, videogame development, web application development or implementation of games engines. This research work describes the development of a Web-based platform for the generation of educational rules – based games by implementing gamification techniques. The generated educational applications meet with established characteristics through learning attributes and game attributes. The gamification techniques implemented are motivation, action and reward. The motivation is the ability to create an incentive to get users to enter in the game. The action are the activities developed by the user to reach a reward, the actions depend directly on the user creativity. Reward is the moment in which the user receives his award or an incentive. It is important to remark the ability to integrate other gamification techniques such as achievements or feedback to mention but

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