

Chapter 11

Moodle Game-Based Tool Trivoodle to Support the Learning of Programming Languages and Paradigms

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ABSTRACT

The challenge of teaching programming languages and paradigms is a very complex task that requires of adequate strategies and educational tools. This chapter presents a game-based educational tool, Trivoodle, developed and used to support the teaching and learning of programming languages and paradigms. Trivoodle is integrated into the learning management system Moodle that is used as educational eLearning platform by the University of Valladolid. The chapter describes the mechanics in playing Trivoodle. The chapter also describes the result of a qualitative analysis of its use in two engineering courses related to programming offered to students in two different study programs at the University of Valladolid.

INTRODUCTION

Within our educational system there are a lot of courses whose objective is to teach different programming languages and paradigms to the students. In Spain, these courses are mainly offered to University students. The learning of programming languages and paradigms is tough and requires a lot of experimentation. This discipline is also very different to others in which students take formulas or memoriza-

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tion procedures as a base. Programming requires a lot of additional work which is developed within the classroom, especially when compared to more theoretical fields of study (Brito & Sá-Soares, 2014). According to Vega et al. (2013) students have the perception that programming is a difficult field of study and it is quite frequent to hear about problems related to frustration and lack of motivation. Moreover, programming is hard to teach, in fact, there are professors that think that programming requires a set of abilities more than a bunch of knowledge (Tan et al., 2014).

In such a complex context, gamification can play an important and positive role. Teachers can use game mechanics in non-game contexts to engage students in solving problems and increase their motivation and academic performance. People who participate in games develop more intellectual abilities than those who do not (Estalló, 1994). Some studies have shown that the part of spare time that we spend gaming exceeds the part of spare time that we spend watching television (García-Peñalvo et al., 2013). For this reason, it is a challenge to take advantage of the benefits of games for educational purposes.

In order to explore the possibilities of using game-based educational tools in the formal teaching of programming languages and paradigms, a game-based educational tool Trivoodle has been developed and tested in different courses offered at the University of Valladolid for engineering students. Trivoodle has been developed as Moodle-based tool. The reason is that Moodle is the educational eLearning platform used by the University of Valladolid to support the teaching and learning process in formal courses.

Trivoodle uses different strategies to increase students' motivation. As an example, Trivoodle makes use of a board and chips and students are encouraged to non-stop gaming in order to obtain a higher score than that of the other players. The objective is that students really enjoy themselves as they do when they play a game they like in their spare time.

The experiences have been carried out in two engineering courses. As the number of students that participated in the experiences was low, it was decided to base the analysis in qualitative procedures, i.e. to observe the students' opinion, both the opinions expressed verbally as well as those expressed through the different discussion forums created for this purpose.

Therefore, the objective of this chapter is to present a Moodle-game-based tool that aims to support the teaching and learning process of programming learning and paradigms. As well as to test the game-based educational tool in a university academic environment in order to determine the usefulness of gamification in such a context for both students and teachers.

BACKGROUND

The use of games as learning tools is known as Game Based Learning (GBL) and has increased its importance during the last decades. Internet, the Web 2.0 or the social networks has contributed to this. Technology-based games are very popular for the younger generations, as for them technology has always existed and is integrated into their lives (Simões et al., 2013).

The possibility to play online thanks to wireless and broadband networks promotes the use of games in mobile devices such as smartphones and tablets. Augmented Reality and Mixed Reality offer new possibilities in the development of games. All these improvements in technologies, as well as the continuous upgrades in the user interfaces, allow new ways for players to interact among themselves (Simões et al., 2013).

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