Chapter 17
Programming Life:
Gamification Applied to the Teaching of Algorithms and Programming Through a Serious Game

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ABSTRACT

This chapter presents the use of gamification as mechanism to support the process of teaching and learning programming through a serious game, titled Programming Life. The aim is to alleviate the difficulties encountered by incoming students in the introductory programming disciplines and to provide the student with a teaching method, to which self-learning is possible, without the need for prior knowledge of content, only with their own efforts. Developing logical reasoning, the ability to solve problems in an algorithmic way and enabling the learning of C language and stimulating the construction of computational thinking in a pleasant and attractive way. The results achieved with the use of Programming Like in classes of algorithms and programming were beyond the initial expectation, and demonstrate that it is possible to provide at the student with a form of playful learning, ensuring that students assimilate concepts and techniques related to programming logic.

1. INTRODUCTION

In the 21st century, information technologies are increasingly present in daily life, solving and simplifying routine tasks, ranging from the use of digital TV to GPS(Global Positioning System) of a car.

Much of this electronic and computational technology is focused on the development of interactive software and communication platforms, which are programmable and allow greater interactivity with users, generating practically and convenience.

The spread of the internet, in terms of contribution, enabled the rapid access to the most varied types of technological innovations presented today, According to ABI(2013), by 2020 will be more than 30 billion devices connected to the internet. This fact show that people will be increasingly dependent on these Technologies. Faced with this reality, it is necessary to adopt a sharp logical reasoning, which is not easy to achieve, because is necessary to change paradigms regarding the teaching methodologies used by teachers in order to approach the programming of the reality os the students.

In this context, a large number of schools have been adopting teaching programs in the programming area. For example, on England where several Technologies are used to teach algorithms (PAULA et al. 2014). In Brazil it can be highlighted some projects like the "Ensino de lógica de programação no ensino fundamental utilizando o Scratch" or in english " Teaching Programming Logic in Elementar School Using Scratch" (OLIVEIRA et al. 2014) and "Ensino de Algoritmos a Nível Médio Utilizando Música e Robótica" or in english "Teaching Medium level Algorithms Using Music and Robotics" (SILVA, 2011).

However, current research indicates a high level of avoidance in higher education in the area of computing, approximately 87% according to Santos (2015). According to the Brazilian Association of Information and communication Technology, of the 174,161 incoming students only 22,895 graduates. The main factor of this evasion in the area is related to a significant level of difficulties demonstrated by the students in programming disciplines, in the first semester. Besides this there is a learning deficit related to the contents that are presented for the development of the computational reasoning, which permeates from elementary school, of children's and adolescents. Given this scenario, it is understood that it is necessary to develop a methodology that involves the interaction of the student with the construction of Knowledge in an attractive and fun way (BRASSCOM, 2012).

There are several solutions that allow to improve the learning of algorithms with focus on the motivation of the student in the teaching-learning process, such as robotics (VAHLDICK et al. 2009), unplugged computing (COSTA, 2012) and Scratch (OLIVEIRA et al, 2014). Another viable possibility would be the use of games (COSTA, 2015), one of the first forms of learning that has been contact since childhood. Games can offer, through simple jokes to more serious and complex challenges, the development of skills that are useful for programing learning.

Given this, games can be useful as an efficient way of teaching, as they help in the development of knowledge, in a playful and motivating way, exercising the player's cognitive ability and ability to solve problems, according Tarouco et al. (2004). It becomes important, then, to seek new didactic strategies, in order to use these resources in building knowledge of programming logic and, making the learning process more user-friendly and attractive (MEDEIROS et al. 2013).

However, the application of games in teaching is still a relatively new concept, even occupying an increasingly significant place in people's lives, where about 74.7% of Brazilians play in some electronic device as stated by Sioux (2016), in the classroom, the education remains traditional. The contents, method and practices remain outside the reality of the student (PEREIRA, 2016).

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