Chapter 1
Games Development for Pedagogical and Educational Purposes

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ABSTRACT

This chapter presents a research developed in collaboration by two higher education institutions. Nowadays, high education programs can only be successful with the use of new technologies in the teaching/learning process, especially when there are special education requirements. Two experiments were carried out: (1) a set of billiard balls, for snooker game, simulated by using physics laws and, (2) aLJo 2009, a game whose aim is to achieve the correct sorting of a sequence to accomplish a common task. Both projects were developed by students from University of Minho (UM), with different background and from different engineering courses. The snooker game, an academic project, aims to demonstrate that, through a simple game, several areas of knowledge can be used. On the other hand, aLJo 2009 was developed considering a collaboration protocol between UM and the Parents and Friends Association of the Citizen with Mental Deficiency (APPCDM), to improve behavior and social skills in patients with mental impairments.

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INTRODUCTION

Several definitions of game can be stated but, in general, a game considers a structured activity focused on pleasure, not discarding the educational purpose. The use of games and simulations as educational tools is well documented (Carpick, 2002; Mayo, 2007; Muñoz, Noguez, McKevitt, Neri, Robledo-Rella, & Lunney, 2009). For the authors, games are viewed as a strategy for getting students to, not only, understand but also to retain the concepts, helping them in soft skills as teamwork, strategy, competition, problem solving (Smith, 2008). Some others studies complement this idea evaluating games from an educational point of view, identifying that they increase the students' level of engagement while interfacing with the game however, learning in a similar way (Muñoz et al., 2009; Annetta, Minogue, Holmes, & Cheng, 2009).

Considering the teaching/learning process and how games can be employed in this process (if they really can), there is a difference between supplying information to the students and delivering learning. To give information simply is not enough for an efficient learning. Intuition, imagination, interactivity are considered as key parts in the learning process. The possibility to individually construct, manipulate, modify and control an experiment is a strong aspect for students. The paradigm 'to learn by doing' in a friendly and animated way is essential to form good professionals, in special in the different areas of engineering. Here, the use of games for pedagogical and educational purposes can play an important role. In this way, students acquire and develop their knowledge by challenging. Each student has his own way of learning: some learn by reading, others by listening and others by experiencing, by doing. With games, learning environments must include the elements to satisfy each student, no matter it is focused on high school learning outcomes or if it is dedicated to promote and develop social competences in disabled persons.

Regarding the use of games to gather engineering students perception of the application of physics laws there are lots of practical examples. Among them, the billiard tables appear as an adequate tool, from very simple examples (MathsIsFun.com, 2008) to more complex systems as in (Free Download Manager, n.d.).

All of these billiards games share similar equipment - a long rectangular table, balls and a stick - but they differ from each other in their goals and styles of play (Mahoney & Davis, 2007).

Nevertheless, in some areas there are not available commercial solutions, or at least solutions to ensure comfort, independence and enjoyment of the whole population. In particular, people who require special education are often "forgotten" by society, resulting in increased difficulty in performing simple tasks. The education system and the educational products on the market are normally targeted at the general population; there are few products with particular characteristics for special education. The existing games in this area have some categories that stand out, as are games of Logical Reasoning, Recognition of Facial expressions/feelings, Visual Perception, Concentration, Memory and also Game Sequences (do2learn, n.d.; GreyOlltwit Educational Software, n.d.). Typically, they respond very well to visual stimuli (as bright colors and multicolor images) and sound stimuli (for example, pieces of music and funny sounds). The aim of this work is, then, the development of an educational game for young people who require special education, in particular young people with mental disability. Students in special education have a set of characteristics that should be considered in order to enhance the development of certain capabilities. Usually, they have low attention, many of them cannot read or write, and have little autonomy in carrying out simple tasks from the daily routine (Filho, n.d.). The undemanding task "eating a yogurt" can be very complicated for disabled people, who do not know the correct sequence of actions. This work is part of a research project undertaken through