Chapter 3

A Perspective on the Application of Mastery Learning Theory in Virtual Worlds

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ABSTRACT

Use of virtual worlds in education can be exploited in different educational topics through use of simulations, 3D objects, multimedia resources and educational activities that seek to assist student’s learning. For the realization of these activities, it is necessary to adopt an educational foundation that seeks to guide the processes described. Therefore, this chapter sought to explore the use of virtual worlds with educational theory Mastery Learning, in which the learning activities and educational planning adopted were based on the principles described in this theory. A case of study was applied with a group of students of a discipline of programming and algorithms to show the feasibility of this proposal and explain to readers the particularities of implementation in this integration. Results obtained from this experiment were considered valid and instigators in the middle of the evaluations were positive, and the comments made by students helped to identify a number of difficulties that arose during the experiment.

INTRODUCTION

Expansion use of Information and Communication Technologies (ICT) in the educational field has been proliferated in several areas of education, in which, researchers and teachers have sought to add educational methodologies to the technological resources available in order to improve processes of student’s

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learning. Such initiatives and research meet the current needs of students and teachers, who for the most part are immersed in a social environment, where computing is increasingly ubiquitous.

Such conceptions can be considered for the area of Algorithms and Logic of Programming, in which, it is common to find in courses not directly related to the area of informatics, some disciplines focused on the teaching of this topic, which ends up making it interdisciplinary in some cases. Amaral (2015) explains that in the training of professionals who will work in the development of systems using ICTs, where configures necessary to have disciplines focused on the study of computing itself, is verified that there is a lack of programming professionals, since technological evolution causes a demand for such labor.

For Santos e Costa (2006), the fact of student cannot, in a simple way, build logical reasoning for a problem, can be considered as one of the main factors that corroborate to the high rates of avoidance in programming disciplines and also in courses that have these areas as curricular elements. Several initiatives in recent years have been proposed to mitigate the negative effects of teaching this topic and improve student’s performance in general.

Initiatives that are arising on last years focused on teaching Algorithms and Logic of Programming using virtual worlds, such as OpenSim and Second Life, can be classified as emerging. Such environments provide a virtual space shared by multiple users and provide content production tools focused on the characteristics and needs of end users, not experts (Morgado, 2011).

Features of virtual worlds allow users to create programming scripts using a native language of the environment and insert the final code on 3D objects, which performs a predetermined action present in the script. This possibility opens a propitious field to stimulate the teaching of programming in this type of environment, integrating other types of tools, like Scratch, that can help during the teaching and learning process.

Is important point out that classroom practices embodied in an interactive scenario like proposed by virtual worlds are an instigating pedagogical approach, that can enrich teaching and learning when added to consolidated educational theoretical basis. In implementing these environments demands, several factors must be considered, such as: educational objectives, teaching strategies based on learning theories, friendly and instructional design, objects, experiments and exercises apt to encourage interaction and collaboration among users and give them the feeling of being immersed in the environment (Herpich et al., 2016).

By virtue of its characteristics and mode of application, which will be described in the course of this chapter, the educational theory Mastery Learning was seen by the authors of this work as an interesting and instigating approach to be researched and integrated in this proposal involving the use of virtual worlds for teaching of Algorithms and Logic of Programming. This theory presents a learning method based on the division of a topic in units with predetermined objectives for each, being designed to plan instruction sequences so that all students can achieve a reasonable level of performance in a given content (Marteleira, 2010). Students who have difficulties in reaching the success rate needed to proceed to the following unit can be given reinforcement activities through tutorials, discussions and supplementary materials.

According to Bloom (1984), the basic role of the teacher is focused on planning strategies that take into account each student’s individual characteristics, in order to promote a maximum development of their potential. Bloom points out that in Mastery Learning, various strategies can be developed to help individuals, among which he highlights the use of tutors for each student.
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