ABSTRACT

The support of technological resources in teaching and learning has contributed to make them more efficient and enjoyable. Through this support has become quite common to use media resources before explored only for entertainment for educational purposes, among them the TV. The interactive Digital TV (iDTV) provides resources that make possible the development of a plethora of educational applications. However, since TV is a mass distribution device, an aggravating factor in the use of this media for education is the presentation of contents (learning objects) inadequate according to both the users’ previous knowledge and the subject of courses in which they are enrolled. This paper tries to fill this gap by proposing an educational environment for iDTV, supported by an adequate standard for classification of learning objects for t-learning, in order to deliver educational contents for iDTV, according to users’ knowledge level and suitability of contents to ongoing course.

Keywords: Architectures for Educational Technology Systems, Distance Education and T-Learning, Hypermedia Systems, Lifelong Learning, Media in Education, Multimedia Systems

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1. INTRODUCTION

Increasingly, technological resources have contributed to make the learning process efficient and enjoyable. It became common to use media resources that were once exploited only for entertainment, among them television, with educational goals. Accordingly, research on educational strategies and tools related to interactive Digital TV (iDTV) has been growing steadily in many countries (Arias, Noreis, Duque, Redondo, Fernández, Cabrer et al., 2008).

Due to the differential that iDTV has, like its acceptance by the community, its interactivity with users and be a vehicle for mass diffusion; it is possible to develop a multitude of applications that can be integrated into any digital channel programming. Thus, due to geographical and financial barriers faced by a considerable portion of worldwide students in association with social behaviors of some individuals that are more reluctant to contact with the new technologies, iDTV is an alternative in providing quality education. According to Arias et al. (2008), “TV is present in almost every home and it is so simple and familiar that everyone feels comfortable using it”. But for that to be possible, besides having a television able to receive the digital signal, users need a decoder box of information, called set-top-box (Mendes Neto, 2013).

Educational applications in iDTV (t-learning) can make use of the advances already achieved by the area of educational technologies as, for example, Learning Objects (LOs), standardized by the LOM standard (Learning Object Metadata). The importance of developing standards in order to improve the specification of LOs is reflected through the work done by reputable organizations like IEEE and Global Learning Consortium, which proposed the LOM standard, which allows LOs to be sorted, reused and found by search engines properly (IEEE, 2013).

The standard for classification of LOs known as SCORM (Shareable Content Object Reference Model) (Advanced Distributed Learning, 2013b) is also widely used, and describes how the content can be modeled and how the learning management environments should deal with this, by making content for reuse (Advanced Distributed Learning, 2013a). However, there is a problem in how to adjust educational contents, so as to better support the search and navigation mechanism to make them available in the iDTV platform in order to present an effective and personalized learning. Another problem that arises in this context is how to make the Learning Objects (LOs) become more suitable through their specification in SCORM, aiming at the proper presentation for iDTV. To fill this gap, in a previous work, we have proposed an extension to the SCORM standard, called T-SCORM, in order to provide better support to search, navigation and visualization of LOs with educational contents for t-learning.

In order to facilitate the process of reading and adding of the T-SCORM extension, we have developed an authoring tool named T-SCORM Adapter, which is able to apply this extension in a fast and efficient way. This ensures that the T-SCORM extension may be added with the new metadata elements within the LOM structure, improving the classification and the specification of LOs with educational content for iDTV (Silva, Mendes Neto, Burlamarque, Silva & Lessa, 2012b).

This paper proposes an advance in this previous work through the development of an educational environment for iDTV, supported by a multi-agent system, able to deliver educational contents for iDTV, according to users’ knowledge level and suitability of contents to ongoing course. The proposed approach makes use of the standard for classification of learning objects T-SCORM, which enables the construction and representation of knowledge about LOs; besides intelligent agents, which are able to recommend contents according to users’ context. The approach proposed in this paper uses a Genetic Algorithm (GA) to perform the recommendation of educational contents.

The remainder of this paper is organized as follows: Section 2 presents the theoretical referential that was relevant for this work; Section 3 discusses some related works; Section 4 describes the design of the proposed approach;
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