Chapter 12

Improving User Profiling for a Richer Personalization: Modeling Context in E-Learning

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ABSTRACT

This chapter presents the context-aware aspects of ADAPTSUR, a personalization approach designed for e-learning environments. The main features of ADAPTSUR are described and illustrated, showing how to use it to model context and culture for personalization in e-learning environments. The authors describe two materializations of the proposed approach, an adaptive e-learning system and an intelligent tutor, which provide personalized assistance to students taking into account their profiles. Finally, the authors discuss the benefits of their proposal.

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INTRODUCTION

E-learning, as a discipline and as a technology, has undergone considerable changes over the last decade. E-learning environments (ELEs) have gained wider acceptance and are currently being used by a wide variety of students with different skills, backgrounds, interaction preferences, and learning styles. Such diversity has brought new opportunities and new challenges. Therefore, it is important to discuss ways to improve these environments.

Two of the most desired characteristics of these systems are those of being adaptive and personalized (Brusilovsky & Peylo, 2003). Personalization has affected many works on e-learning, as witnessed by the rising interest in some approaches (De Bra, 2008; Peña et al., 2002). Research has shown that to be effective, an ELE must be adapted to the student’s context (Abarca et al., 2006). In our work, ‘context’ is considered as having cultural and technological perspectives, in addition to previous individual and educational contents frequently related to student profiling. A context-aware e-learning environment is a web-based educational application that adapts its behavior according to its students’ context. Context-aware applications use and manipulate context information to detect the situations of users and adapt their behavior accordingly. A contextualized ELE provides the learner with exactly the material he/she (hereinafter the user will be referred as he) needs, this material is appropriate to his knowledge level and makes sense in a special learning situation, which is called “scenario” in our work. Thus, for each scenario and for each learner, an ELE is dynamically adjusted depending on both the student profile and the available context information.

In addition, learners may benefit from the inclusion of multicultural aspects into ELEs (Pawlowski, 2008; Savard, Bourdeau & Paquette, 2008). Research in education has shown that methodologies cannot always be displayed in the same way, and cannot be universally applied because their effects can vary from one culture to another, i.e. some tactics may be effective in a cultural group, but not in another. Like other software applications, ELEs are usually restricted to one personalization strategy per country. However, a predefined localized personalization scheme cannot be assigned to all the people of a nation, as some people might have many cultural influences and are, therefore, culturally ambiguous (Reinecke & Bernstein, 2008). Thus, researchers are focusing on cultural aspects to produce learning technologies, and to understand the dimension of the influence that a cultural background has on the choice of underlying teaching methodologies. In our approach, we consider culture as a different contextual dimension. Cultural context describes cultural characteristics on different levels, such as the national, organizational or individual characteristics of the learners. It might include the learner’s language and ideological, political or religious aspects (Pawlowski, 2008).

In this chapter, we present the context-aware and culture-oriented aspects of an adaptability approach called Adapt-SUR. Adapt-SUR is an international joint project between Argentina and Brazil. The approach is designed to be integrated into two distinct ELEs: the AdaptWeb (Adaptive Web based learning Environment) system (Freitas et al., 2002) and the eTeacher+SAVER (Software de Asistencia Virtual para Educación Remota) environment (Schiaffino, Garcia & Amandi, 2008). This study describes the main features of the context-aware and culture-oriented aspects of a student profile and shows how to organize this contextual information in a multidimensional space where each dimension is represented by a different ontology, which may be handled separately or jointly. Finally we use some examples to discuss and illustrate how to use cultural information to provide context-based e-learning personalization.

The chapter is organized as follows. In “Background on User Profile Contents in E-learning..."
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