Chapter 7
A Standard-Based Framework to Support Personalisation, Adaptation, and Interoperability in Inclusive Learning Scenarios

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ABSTRACT
This chapter introduces a standards-based and adaptive framework whose main objective is to adapt user interfaces, content and learning environment to learners’ needs, including their functional diversity issues (i.e., disabilities). The framework is intended to be general (e.g., two different learning management systems and two large pilot sites are being considered) and to that end it is implemented in terms of an open architecture, which aims at providing services for Accessible Lifelong Learning. The chapter focuses on accessibility and adaptation issues, and their interoperability requirements. The covered topics are the required standards, interoperability requirements of the architecture, user model, recommender

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system, and their application to the end-user services that are being implemented at UNED University, one of the large pilot sites of the EU4ALL European project. Some of the challenges and solutions provided are discussed as well as the future work of related research areas.

INTRODUCTION

Learning ideally should be a personalised and adaptive process for all, which from the beginning to the end must consider the learner’s specific needs and preferences. Regrettfully though, students with specific needs, such as those with functional diversity issues (i.e., the so-called disabilities), have problems in accessing learning because of the diverse barriers that may exist in the various stages they must go through to realise their learning or teaching goals. In fact, while many physical barriers have been removed in Higher Education (HE) Institutions, Information and Communications Technology (ICT) services are still not fully accessible to an increasing number of students whose main educational option is distance learning.

Actually, accessibility, adaptation and learning are three interrelated issues with a growing interest in our society (Iorio, Feliziani et al., 2006; Kelly et al., 2007, Lanzilotti, Ardito et al., 2006; Seale et al., 2008). For that reason, European level initiatives, especially the Lifelong Learning (LLL) Programme (LLL Programme, 2006), promote and regulate actions to enable the conditions for everyone to take part in the information society. The main goal is to bring about “services, procedures, and information in an accessible way for every person”, assuming that “e-learning products and methods are able to take into account individual needs and learning-styles, and that they are not based on a ‘one size fits all’ philosophy, in which learners are seen as standardised ‘units’” (eLearningPR, 2004). A wide range of international and national legislations support individual rights and attendance to functional diversity issues. To name but a few, in Europe the E-Government-Law in Austria; Equal Status Act in Ireland; BITV in Germany; LSSICE in Spain; SENDA in the UK, etc. (WAB Cluster, 2009), the well known ADA in the US, and needless to mention the relatively recent International Convention on the Rights of Persons with Disabilities, which remarks in its article 24.5 (Education) that “States Parties shall ensure that persons with disabilities are able to access general tertiary education, vocational training, adult education and lifelong learning without discrimination...”.

Despite available legislation and expected benefits from student-centred approaches in HE, leveraged by the European Higher Education Area (EHEA, 2009), from enrolment to assessment, students have to negotiate pre-established general procedures. These procedures are nowadays mediated mainly by technology (EUNIS, 2009) and intended to fulfil a “standard” set of needs but are far from considering the students’ individual needs and preferences. In fact, it is disturbing to note that the most basic requirements of people with disabilities are usually not attended in HE (Seale, 2006), and very often it is due to the unavailability of information before-hand, the lack of pre-established procedures to attend particular needs and the multiple and diverse barriers that have to be overcome to provide the required infrastructure (Cooper et al., 2006).

To mitigate the problems related to functional diversity issues in education and with a mainstream inclusive approach focused on attending the personal needs of the learner, the aDeNu (Adaptive Dynamic online Educational systems based oN User modelling) research and development group at UNED (Spanish National University for Distance Education) has developed standard based components designed to compose an open
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