Chapter VIII
Accessibility, Digital Libraries, and Semantic Web Standards in an E-Learning Architecture

Sean W. M. Siqueira
Federal University of the State of Rio de Janeiro, Brazil

Maria Helena L. B. Braz
Technical University of Lisbon, Portugal

Rubens N. Melo
Pontifical Catholic University of Rio de Janeiro, Brazil

ABSTRACT

As people have come to realize that the use of technology can improve the learning process, e-learning has began to increase in importance. However, e-learning tools are not usually developed to interoperate with each other, making the creation of a fully functional environment a difficult task. Organizations such as IMS Global Learning Consortium, Advanced Distributed Learning and IEEE Learning Technology Standards Committee are aware of this problem and are working to develop technical standards, recommended best practices and guides for learning technology. There are also proposals for e-learning architectures which try to structure and describe the fundamental components to be included in this kind of environment. The main aim of this chapter is to provide an overview of existing standards and e-learning architectures, discussing their evolution and presenting the most significant results and initiatives. In addition, accessibility, digital libraries and semantic Web technologies are discussed within this context.

INTRODUCTION

Education can be seen as a combination of three main elements: administration, pedagogy and technology, which through a variety of combinations result in different educational and training systems with different approaches. Whenever there is a new strategy, method or technique in one of these areas, then that innovation will soon be found in educational and training systems.

Nowadays, there is a growing consciousness of the importance of education in coping with the rapid changes in human society. Since time and space restrictions could prevent the access to education, and since the use of technology can circumvent these barriers and enhance the learning process, there is a great interest in the development of e-learning both in the business world and in academic forums. In addition, there is a movement towards cooperation and partnership, which has led to the development of communication tools important in the support of collaborative learning. The groupware approach complements this scenario as it also includes coordination and cooperation mechanisms for collaborative learning.

Several educational environments have been implemented and used, and a variety of e-learning courses have been offered. Thus, there are numerous different educational environments which have different approaches for e-learning and which provide diverse combinations of services. The existence of so many environments brings about many interoperability problems. This "world of differences" makes the cooperation between educational and training partners difficult as far as the reuse of e-learning content and services are concerned.

Some organizations are aware of these problems and have been working to develop technical standards, specifications, recommended best practices and guides for learning technology. Nevertheless, the main focus of their work has been on enabling content reuse, especially through the description of learning content (e.g., IMS Learning Resource Meta-Data Information Model, ("IMS Learning Resource", 2001), ADL SCORM ("SCORM," 2006) and IEEE Learning Object Metadata (LOM) ("Draft Standard," 2002)).

These standards and specifications are becoming increasingly important, but, although they are advancing the goals of learning content interoperability, they do not provide a general architecture that would guide the development of flexible and configurable e-learning systems.

In terms of e-learning architecture, IEEE LTSC (Learning Technology Standards Committee) presented in 2001 a proposal—the IEEE Learning Technology Systems Architecture (LTSA) ("Draft Standard," 2001), which specifies a high level architecture for information technology-supported learning, education, and training systems.

This draft standard identifies the objectives of human activities and computer processes and the categories of knowledge involved. Therefore the architecture is human-computer oriented and does not provide a general overview of software components and available technologies for building an e-learning environment.

In the literature, it is possible to find some proposals for general e-learning architectures; those we consider more interesting are presented and discussed in the next section, where we also present an overview of existing standards for e-learning, followed by a discussion of a generic architecture and its software components. We also consider the data and metadata components, and describe LORIS architecture. Learning objects repositories' integration system (LORIS) aims at providing an integrated view of Learning Objects for an entire e-learning community while maintaining the local autonomy of each member. The chapter concludes with some future trends and final conclusions about e-learning architectures.

The main aim of this chapter is to provide an overview of e-learning architectures, discussing their evolution and the efforts towards standardization. Accessibility, digital library and semantic

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