Chapter II

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ABSTRACT

In this chapter the authors present E–World, an e–learning platform able to manage and trace adaptive learning processes which are designed and created by means of a visual language based tool. To address the goal to have a platform easily extensible with new services, they have designed it selecting a software architecture based on the use of Web Services and a suitable Middleware component. To trace adaptive learning processes E–World also integrates as Web Service a suitable implementation of a Run–Time Environment compliant with the Sharable Content Object Reference Model (SCORM) standard. Their proposal also supports the “anytime and anywhere” learning paradigm as it enables learners to enjoy linear or adaptive processes using any device equipped with a standard Web browser. In the chapter they also report on the experiment we have carried out to assess the usability of the proposed e–learning platform.
INTRODUCTION

During the last decade a surprising evolution of electronics, computer systems and information technologies, together with the worldwide accessibility to the Internet have made available an incredible set of applications. This trend has significantly conditioned the emerging and the evolution of new academic and industrial opportunities. In particular, the possibility to easily reach an extremely large number of users with significantly low costs has motivated the development of an increasing number of web applications for educational purposes. As a result, e-learning has achieved a worldwide acceptance in several domains, such as universities, secondary schools, companies, and public institutions.

The e-learning evolution proposes a good number of tools assisting instructional designer during the analysis, design, and delivery of instruction and on the other side provides powerful tools supporting students during the knowledge acquisition process. Nowadays, the traceability of learning process is becoming more and more interesting for both teachers and students. In particular, teachers use the achieved information to compare the expected target audience with the students, who really attend the course. Moreover, information on learning performances and the explicitness of teaching materials can also be analyzed to assess the agreement with the teacher expectations. From the student point of view, traceability information is used to assess the acquired knowledge and plan the efforts in the knowledge augmentation process. In order to trace the learning processes several kinds of e-learning platforms have been proposed in the market, see e.g. (IBM, 2008)(BlackBoard, 2008).

To make the knowledge delivery more effective the personalization of the learning process is crucial as didactic contents are usually intended for very large and heterogeneous groups of learners in settings where no teacher is available to help them. Thus, e-learning processes should adapt themselves to the learners’ background and to their achieved knowledge. The use of adaptive processes should move e-learning from teacher-centered to student-centered, thus making the knowledge acquisition more flexible and effective.

Initially, different kinds of communication infrastructures between e-learning content objects and e-learning platforms were defined and used. On the other hand, in the last few years standards providing standardized data structures and communication protocols have been proposed. In particular, the ADL (Advanced Distributed Learning) consortium (ADL, 2004) produced the SCORM (Sharable Content Object Reference Model) (ADL SCORM, 2004), consequently the collaboration among government, industry and academia to enable interoperability, accessibility, and reusability of Web based didactic contents.

Currently, other relevant challenges characterize the e-learning research, such as interoperability, reuse and extensibility of software components. In order to understand that, it is worth noting that the success of e-learning has caused the proliferation of several kinds of e-learning related software applications, from content delivery to collaborative environments. As a result, many companies are entering in the learning market developing new products and often combining existing components opportunely configured. Thus, it is important to understand how these systems relate to each other and how they fit into a complete e-learning environment. Moreover, the issue of component interoperability is especially relevant to promote reuse of services and develop e-learning systems starting from heterogeneous components.

In order to address the above issues we propose an e-learning platform named E-World, whose software architecture is based on Web Services (Bosworth, 2001), (Roy & Ramanujan, 2001) and on a suitable Middleware component (McKinley et al., 1999). Web Services technology provides a common infrastructure to integrate hetero-