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Technology-enhanced Training for All supported by the e-Access2Learn Approach

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ABSTRACT

During the past years the design and development of web-based educational systems for special groups of learners has attracted the attention of technology-enhanced learning community. However, although a number of e-training systems are designed to meet accessibility needs and preferences for those groups, most of them anticipate special-purpose training material and keep their training activities local to the system. In this way, accessing digital educational resources widely available in web repositories is not supported, and so it is the sharing of best training practices among the communities of practitioners and organizations. Within this context, in this paper we present the e-Access2Learn approach which aims in providing tools and services that facilitate the design and production of accessible eTraining Resources, Activities and Courses that bear the potential to be inter-exchanged between different e-Training Platforms and Programmes.

KEYWORDS: Accessible eTraining resources, Accessible eTraining courses, Technology-enhanced training for all, People with special needs

INTRODUCTION

During the past years, accessibility has been recognized as a key design consideration for web-based educational systems (Mirabella et al. 2004). As a result, a number of systems have been proposed aiming to meet the educational needs of people with special abilities. However, most of these systems: (a) are typically supported only by training resources that are specially designed to meet the accessibility requirements of a particular user group and (b) their training activities are not represented in such a way that they can be identified and inter-exchange between the various systems (Poulson & Nicolle 2004), (Seeman 2004). The main drawbacks of these approaches is that (a) the development of special-purpose digital training resources is costly and thus, their limited sharing and reuse increases the barriers of certain categories of learners to access training and (b) valuable experiences on best training practices, gained through local use, can not be easily identified and adopted by the communities of practitioners and training organizations. In this paper, we present the e-Access2Learn approach which aims in providing tools and services that facilitate the design and production of accessible eTraining

Resources, Activities and Courses that bare the potential to be inter-exchanged between different e-Training Platforms and Programmes.

THE E-ACCESS2LEARN APROACH TO TECHNOLOGY-ENHANCED VOCATIONAL TRAINING FOR ALL

The key objectives of the e-Access2Learn approach adopted by the e-Access II Project (<http://www.eaccess2learn.eu>) are:

- Representation of established training practices in a formal and technically reusable way using international specifications (such as IEEE LOM (IEEE 2002) and IMS Learning Design (IMS 2003)), so that both digital training content and e-training practices can be reused and inter-exchanged between different platforms and systems.
- Development of a Web-based Repository with accessible e-Training Resources, Activities and Courses, facilitating their storage, search and retrieve.
- Validation of the key project concepts and results in different European countries.

e-Access2Learn Main Stakeholders

The e-Access II Project identifies three main stakeholders in technology-enhanced training, as presented in Figure 1, namely,

- *eTraining Content Suppliers*, that is, the entity responsible for designing and developing independent eTraining Resources in the form of Learning Objects (Karampiperis and Sampson, 2004). This entity needs to convert their existing eTraining Resources (or create new digital resources) so as to meet accessibility requirements of people with special abilities. The e-Access II project provides them with a set of guidelines and the technological means for developing accessible eTraining Resources, characterizing them with appropriate educational metadata and storing them in a web-based repository of eTraining Resources.
- *eTraining Courses Suppliers*, that is, the entity responsible for designing eTraining Courses as a synthesis of appropriately selected eTraining Activities based on a predefined scenario that reflects the adopted training approach. The e-Access II project provides a methodology and the technological means for defining their e-training strategies and for representing them following the IMS Learning Design Specification (IMS 2003). Based on Generic e-Training Templates that represent best practices, and through the use of the eAccess2Learn Web Repository, e-Course designers can develop their e-training scenarios populated with accessible digital resources.

- *eTraining Services Providers*, that is, the entity responsible for designing eTraining Programmes as a synthesis of eTraining Courses and for delivering eTraining services to end users. The e-Access II project provides them with access to a repository of eTraining Courses (in the form of Learning Designs and SCORM-compatible e-courses).

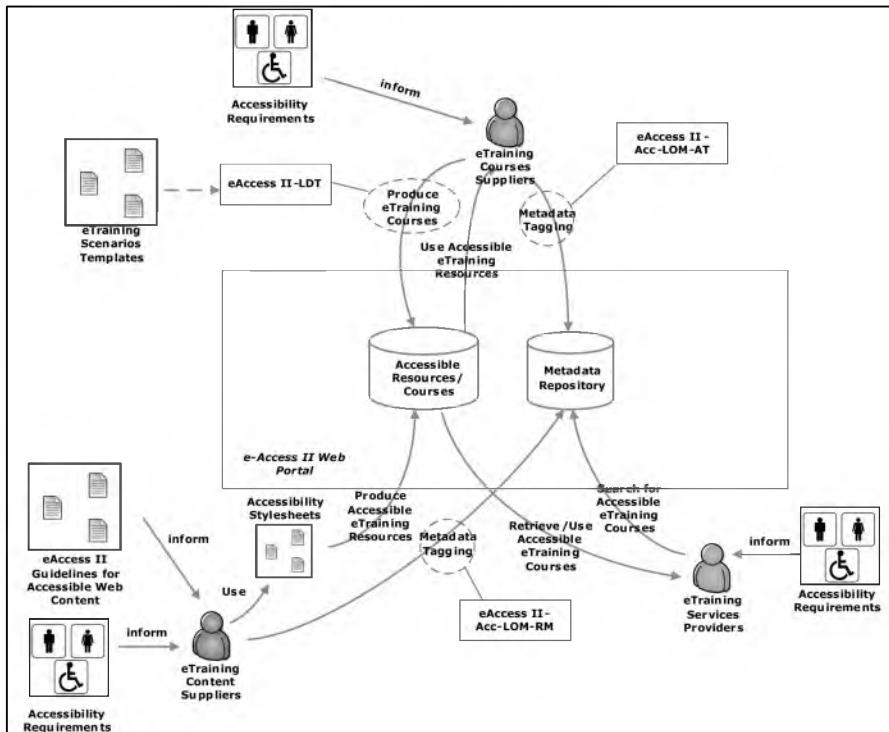


Figure 1: e-Access2Learn Framework

e-Access2Learn Services and Tools

The key Services and Tools of the e-Access II Project are:

- *The e-Access2Learn Guidelines for the development of accessible web-based training content*, that is a set of mandatory guidelines, based on the W3C Web Content Accessibility Guidelines 1.0 (W3C 1999), which ensure the accessibility of the produced eTraining Resources and eTraining Courses for visually impaired people and people with motor disabilities. By following these Guidelines existing eTraining Resources can be verified and upgraded, in relation to accessibility requirements.

- The *e-Access2Learn Accessibility Style Sheets*, that is Cascading Style Sheets (CSS) for HTML-based content that facilitate *eTraining Content Suppliers* to make their eTraining Resources accessible, as well as, *eTraining Courses Suppliers* to make their eTraining Courses accessible. As presented in Figure 2, by applying the e-Access II Accessibility Style Sheets the presentation of the e-Training Resources are becoming accessible for people with certain special needs.

<p>3. What is a Hard Disk?</p> <p><input type="radio"/> A special device for saving huge files <input type="radio"/> A computer storage accessory <input type="radio"/> A kind of CD ROM used by army - it's unbreakable <input type="radio"/> Main part of laser printer</p> <p>4. Who cooperates with LCD monitor?</p> <p><input type="radio"/> Only processor <input type="radio"/> Graphic card <input type="radio"/> Modem</p> <p>5. What has a 3.5" size?</p> <p><input type="radio"/> Monitor <input type="radio"/> Diskette (with 1.2 / 1.44 MB capacity) <input type="radio"/> Printer paper</p> <p>6. Can computers communicate one another?</p> <p><input type="radio"/> Yes, always, no features are necessary <input type="radio"/> No, never <input type="radio"/> Yes, but they must have network card or modem</p> <p><input type="button" value="Submit"/> <input type="button" value="Reset"/></p> <p style="text-align: center;">Non-Accessible Version</p>	<p>CD ROM used by army - it's unbreakable <input type="radio"/> Main part of laser printer</p> <p>4. Who cooperates with LCD monitor?</p> <p><input type="radio"/> Only processor <input type="radio"/> Graphic card <input type="radio"/> Modem</p> <p>5. What has a 3.5" size?</p> <p><input type="radio"/> Monitor <input type="radio"/> Diskette (with 1.2 / 1.44 MB capacity) <input type="radio"/> Printer paper</p> <p>6. Can computers communicate one another?</p> <p><input type="radio"/> Yes, always, no features are necessary <input type="radio"/> No, never <input type="radio"/> Yes, but they must have network card or modem</p> <p><input type="button" value="Submit"/> <input type="button" value="Reset"/></p> <p style="text-align: center;">Accessible Version</p>
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Figure 2: e-Access2Learn Accessibility Style Sheets

- The *e-Access2Learn Learning Design Toolkit (e-Access2Learn-ASK-LDT)*, that is, a software tool enabling *eTraining Courses Suppliers* to design and develop eTraining Courses using a Reference Set of predefined Generic eTraining Scenarios Templates. The e-Access2Learn Learning Design Toolkit is presented in Figure 3 and provides *eTraining Courses Suppliers* with a graphical user-friendly interface for creating eTraining Courses conformant with IMS Learning Design Specification (IMS 2003) and packaging them along with their related e-Training Resources following the IMS Content Packaging Specification (IMS 2004). Furthermore, by using the e-Access2Learn Learning Design Toolkit, eTraining Courses Suppliers for people with special needs with similar needs around Europe (and globally) can exchange eTraining practices and assess their application at a local/national context of use.

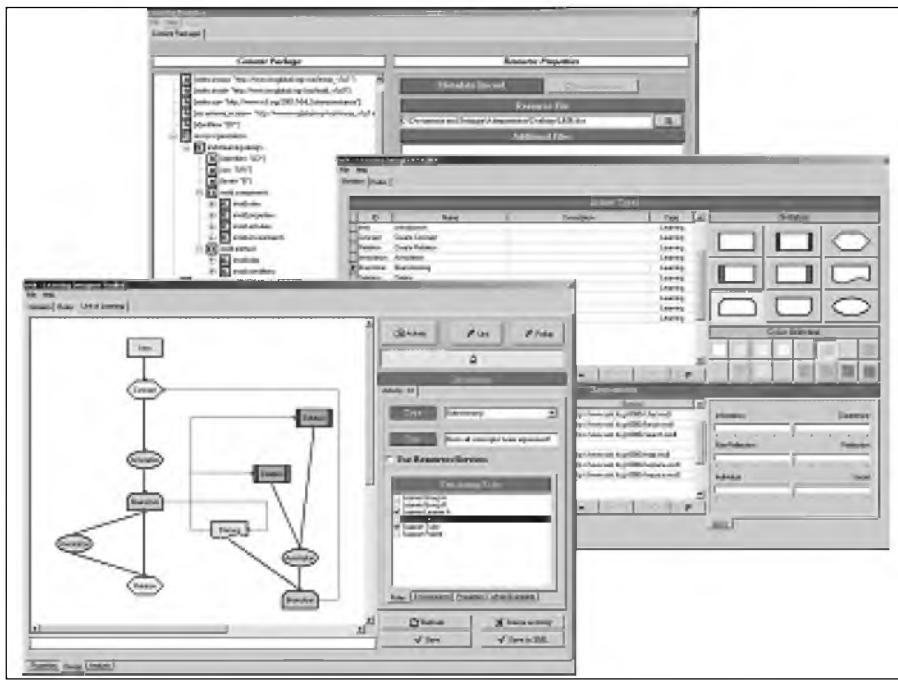


Figure 3: e-Access2Learn Learning Design Toolkit

- The *e-Access2Learn Accessible Learning Objects Metadata Authoring Toolkit* (*e-Access2Learn-ASK-Acc-LOM-AT*), that is, a software tool that facilitates *eTraining Content Suppliers* and *eTraining Courses Suppliers* in their educational metadata authoring, as well as, in the administration of *eTraining Resources* and *Courses* through the *e-Access2Learn Web Repository*. The *e-Access2Learn Accessible Learning Objects Metadata Authoring Toolkit* is presented in Figure 4 and provides *eTraining Content Suppliers* and *eTraining Courses Suppliers* a user-friendly authoring wizard for describing their *eTraining Resources* and *Courses* with educational and accessibility metadata conformant with IEEE Learning Objects Metadata Standard (IEEE 2002). Moreover, by using the *e-Access2Learn Accessible Learning Objects Metadata Authoring Toolkit*, *eTraining Course Suppliers* can provide descriptions of available *eTraining Courses* with emphasis to accessibility aspects, so that to enable *eTraining Services Providers* to take more informed decisions on the design of their *eTraining Programmes*.

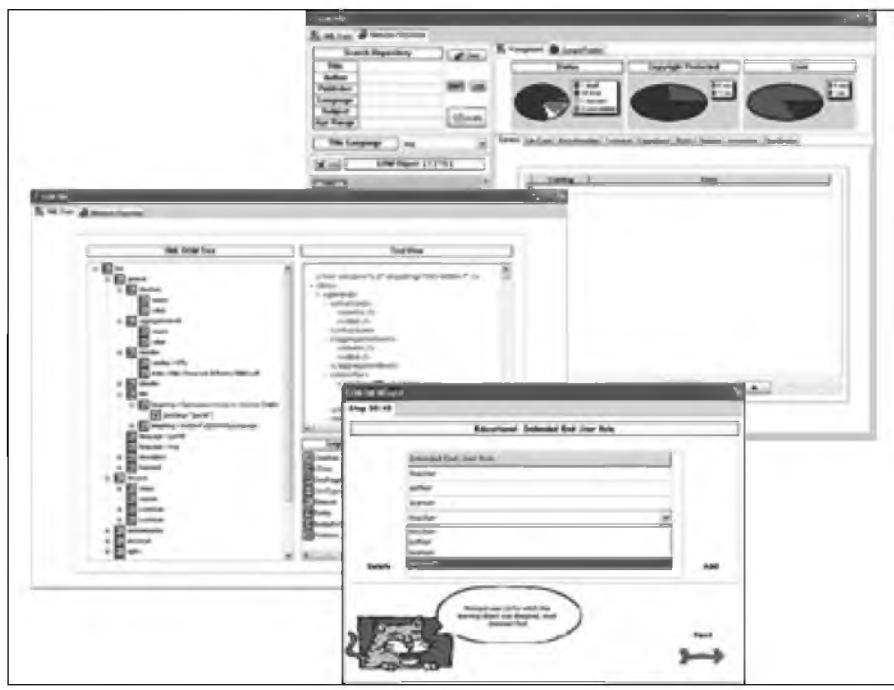


Figure 4: The e-Access2Learn Accessible Learning Objects Metadata Authoring Toolkit

- The *e-Access II Repository of eTraining Resources and eTraining Courses*, that is, a web-based platform enabling *eTraining Content Suppliers* and *eTraining Course Suppliers* to share their eTraining Resources and eTraining Courses. Moreover, the e-Access2Learn Repository will offer to *eTraining Services Providers* the ability to search and retrieve eTraining Courses for their end-users. The e-Access2Learn Repository of eTraining Resources and eTraining Courses is presented in Figure 5 and it is conformant with Web Content Accessibility Guidelines 1.0 (W3C 1999) enabling also accessibility to users with disabilities.



Figure 5: e-Access2Learn Repository of eTraining Resources and eTraining Courses

CONCLUSIONS

In this paper we present the e-Access2Learn approach to Technology-enhanced Vocational Training for All. In this framework, we identify the main stakeholders and we present the key Services and Tools which empower them in the process of design and production of accessible eTraining Resources, Activities and Courses, that bare the potential to be inter-exchanged between different e-Training Platforms and Programmes.

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