Adapting Learning Environments with AccessForAll

Greg Gay
Faculty of Information
Adaptive Technology Resource Centre
University of Toronto
130 St. George St.
Toronto, Ontario, Canada
01 416 978-4043
g.gay@utoronto.ca

Silvia Mirri
Department of Computer Science
University of Bologna
Via Mura Anteo Zamboni 7
40127 Bologna (BO), Italy
39 051 2094880
mirri@cs.unibo.it

Marco Roccetti
Department of Computer Science
University of Bologna
Via Mura Anteo Zamboni 7
40127 Bologna (BO), Italy
39 051 2094503
roccetti@cs.unibo.it

Paola Salomoni
Department of Computer Science
University of Bologna
Via Mura Anteo Zamboni 7
40127 Bologna (BO), Italy
39 051 2094880
salomoni@cs.unibo.it

ABSTRACT
ATutor is an Open Source Web-based learning environment that has accessibility as a guiding development principle. From its beginning, ATutor was created to fill a need for an accessible network-based Learning Management System (LMS) [2] [3]. Continuing with its attention to accessibility, ATutor adds the first implementation of the ISO FDIS 24751 [4] accessibility standards.

Categories and Subject Descriptors
K.3.1 [Computer Uses in Education]: Distance learning; K.4.2 [Social Issues]: Handicapped persons/special needs.

General Terms
Management, Design, Human Factors, Standardization.

Keywords
Learning Management, accessibility, content adaptability, IMS AccessForAll, ISO FDIS 24751.

1. INTRODUCTION
In August 2004 the IMS Global Learning Consortium introduced the AccessForAll Metadata Specification (ACCMD) and the Accessibility for Learner Information Package Accessibility for LIP specification (ACCLIP) [5]. These specifications were developed to standardize the way content and learning environments match the needs of individual learners. Adoption of these specifications has been slow. Work is underway at IMS on AccessForAll 2.0 to improve upon the first version of the specifications [1].

The ISO FDIS 24751 [4] standards were introduced in September of 2008 as another way of matching learning environments to users. They include two sub-standards: the Digital Resource Description (DRD), and the Personal Needs and Preferences (PNP). The ISO standards closely resemble the IMS ACCMD and ACCLIP specifications.

With the release of the ISO standards while this project was underway, the original goal of implementing IMS AccessForAll 1.0 changed to implementing ISO FDIS 24751, understanding that it would influence the developing IMS AccessForAll 2.0.

Implementing AccessForAll in ATutor is described in Section 2 that follows, and can be summarized as three areas of development:
1. Adding user Display, Content, and Control Preferences (Implementing ISO PNP).
2. Extending the ATutor Content Editor to author adapted content, and displaying that content when learner content preferences call for it (Implementing ISO DRD).
3. Extending Content Packaging to include importing and exporting of AccessForAll content.

Finally Section 3 concludes with a summary of the lessons learned and the outcomes of the project.

2. IMPLEMENTING ACCESSFORALL IN ATUTOR
2.1 Personal Needs and Preferences (PNP)
Implementing ISO PNP in ATutor involved collecting user set preferences through a Web form, enabling these settings into a session each time a user logs in, and having settings do something to the environment if they are turned on. Similar settings already existed in ATutor so it was primarily a matter of attaching the new preference settings to those already in a user session.

User preferences are set through a series of four tabs added to the ATutor Preferences configuration tool, like that shown below in Figure 1. Users can control the Display appearance, the forms of...
Content they prefer, the scaffolds they prefer to use, and the Controls they use to navigate.

Once preferences are stored in a session, they are rendered either through conditional statements scattered throughout theme templates, or through a generated style sheet which overrides a theme’s styles with those of the user.

Content authors can choose to export adapted content with the content packages they distribute, and instructors and course designers can choose to import adapted content when restoring content packages into their course learning materials.

3. CONCLUSIONS

In this first implementation of AccessForAll we learned a couple lessons.

First we needed content to either append to, or replace original content, allowing users to display adaptations as supplemental to the original content, or to replace it completely. The standard did not offer an obvious way to accommodate this, so we added our own content preference so learners could themselves choose to append adapted content, or use it to replace original content.

Secondly, we needed adaptations for text content, to accommodate users with print disabilities. The standards were not amenable to such adaptations. Our first attempt at creating adaptations for text was to provide full-page alternatives to original content, though this created conflicts with individual resource adaptations, if for instance the full page and a single resource file both had adaptations for the same particular modality. Adapting larger pieces of content than individual files, involves a whole range of complexities that can fuel further development of standards in areas of personalized learning [7].

The primary outcome of the ATutor AccessForAll project was a relatively complete open source functional implementation of the ISO FDIS 24571 and IMS AccessForAll standards, freely available for use, and for developers to study and improve upon in the ATutor 1.6.2 release.

4. ACKNOWLEDGMENTS

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5. REFERENCES