

Standards and specifications to manage accessibility issues in e-learning

Despite the acknowledged need of providing a personalized and adaptive learning process for all, current learning management systems do not properly cover personalization and accessibility issues and they are still struggling to support the reusability requirements coming from the pervasive usage of standards. There is a lack of frameworks for providing layered-based infrastructure covering the interoperability required to manage the whole range of standards, applications and services needed to meet accessibility and adaptations needs of lifelong learning services.

In the context of the A2UN@ project [1], we have analyzed the existing specifications and standards aimed to cover accessibility issues that can support the description of accessible and adaptive learning scenarios. For this analysis, we have considered as key sources of information the report on accessibility-related standards by Hodgkinson for the CARDIAC European project [2], and the standards inventory in ISO/IEC TR 29138-2 [3]. As a result of this analysis, we have found the existence of overlapping and contradictions between available standards to manage accessibility issues and dynamic support in terms of i) users' models, ii) learning scenarios, iii) interaction preferences, iv) devices capabilities, and v) metadata for specifying the delivery of any resource to meet users' needs.

A proposal of a general infrastructure consisting of several standards-based interoperable components integrated into an open web service architecture of services aimed at supporting adapted interaction to guarantee students' accessibility needs at higher education has been developed at the EU4ALL project [4].

In Table 1 we compile those standards that have a special emphasis on addressing accessibility and usability when dealing with e-learning settings. A set of combined criteria has been used to classify them:

1. Scope, which is divided into user and back end. "User end" has been used to label documents on accessibility user requirements and documents on accessibility guidance for designing/developing user interfaces, while "Back end" labels documents that provide guidance for designing/developing system components that support accessibility but are not part of the user interface
2. Interaction area, which in turn, can refer to any of the following: Content, User, Device (including hardware and software), Adaptation, and User Interfaces.

Standard / Specification	Scope		Interaction area				
	User end	Back end	Content	User	Device	Adapt.	UI
ADL SCORM		X	X				X
CWA 15778		X	X				
CETIS LEAP2A		X		X			
Dublin Core Accessibility Term		X	X			X	
ETSI EG 202 116	X				X		X
ETSI ES 202 746	X	X		X		X	
ETSI EG 202 848	X						X
IEEE std. 1484.1-2003		X					

Standard / Specification	Scope		Interaction area				
	User end	Back end	Content	User	Device	Adapt.	UI
IEEE std. 1484.4-2007		X	X				
IEEE std. 1484.11.1-2004		X	X			X	
IEEE std. 1484.11.2-2003		X	X			X	
IEEE std. 1484.11.3-2003		X	X			X	
IEEE std. 1484.12.1-2002		X	X				
IEEE std. 1484.12.3-2005		X	X				
IEEE std. 1484.20.1-2007		X		X		X	
IMS AccessForAll		X	X	X		X	
IMS Common Cartridge		X	X				X
IMS Digital Repositories		X	X			X	
IMS ePortfolio		X		X		X	
IMS GDALA	X						
IMS LD		X	X				
IMS QTI		X	X				
ISO 9241-110	X						X
ISO 9241-129	X			X		X	
ISO 9241-151	X		X				X
ISO 9241-171	X		X		X		X
ISO 9241-20	X				X		X
ISO/IEC 13066-1	X	X					X
ISO 14289-1		X	X				
ISO TR 22411	X						X
ISO/IEC 19788		X	X			X	
ISO/IEC 24751		X	X	X		X	
ISO/IEC 24752		X			X		X
ISO/IEC 24756		X	X	X	X	X	X
ISO/IEC 24786	X	X				X	X
ISO/IEC TR 29138	X					X	X
W3C CC/PP		X		X	X		
W3C DCO (discontinued)		X			X		
W3C WAI ARIA 1.0	X	X	X			X	X
W3C WAI ATAG	X	X	X		X		X
W3C WAI EARL 1.0		X	X		X	X	X
W3C WAI UAAG	X	X			X		X
W3C WAI WCAG 2.0	X		X			X	

Table 1 - Standards and specifications to describe accessibility issues in e-learning scenarios

It can be seen that there is no single standard able to model this context and the application of a combination of several of them results in overlaps and gaps. There are many conflicting standards that address the same issues but with different views, or that apply to different areas [5, 6].

References

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