Analysis of standards and specifications of quality and accessibility in e-learning

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Abstract. This paper shows the results of a comparative analysis of different standards and models related to the management and assessment of quality in e-learning. Some different specifications have been identified in this scope and a first comparative analysis has been done taking into account the responsible organization, the scope of each standard (product or process oriented), its scope of appliance (general or educative), and if there are or not some associated certification.

Keywords: quality, accessibility, standard, e-learning

1   Introduction

Nowadays the number of standards, specifications and recommendations related to the quality of e-learning is growing up. Created by different organizations, they offer a common framework for regulating the different aspects related to the management and assessment of the quality in virtual education. The main aim of these standards is to improve the quality of products, services or e-learning systems.

This paper will not differ between standard, specification and recommendation terms, it will use the "standard" term for referring all of them, although strictly some are "iure" standards (ISO, CEN, UNE, etc.) and other are "facto" standards (e.g. EGQM). Quality models are also included in this analysis, understanding them as tools for guiding the organizations, in this case to educative organizations. Although specific quality models for virtual education exist, traditionally generic models with a wide implantation have been defined, e.g., European Foundation Quality Management (EFQM), which has been included in this analysis.

The main organizations of standardization are presented in Section 2. The analyzed standards and models are described in Section 3. Sections 4 and 5 show the results of the comparative analysis and the conclusions.

2 Organizations

Six organizations have been considered for the comparative analysis of standards or specifications:

- **ISO** (International Organization for Standardization): Standardization organizations network of 140 countries, which work collaborating with governments, companies and user organizations. The 36 subcommittee of ISO (ISO/IEC JTC1 SC36) was created in 1999 with the aim of covering all aspects related to the standardization in the learning technologies field. This committee is part of the International Electrotechnical Commission (IEC).
- **CEN** (European Committee for Standardization): European regional organization of standardization, which include the workgroup Learning Technologies Workshop (WS/LT), responsible of e-learning standards development in Europe. The standards created by this workgroup are published under denomination CEN Workshop Agreements (CWA), and they try to standardize different aspects related to the quality, competencies, student information or vocabulary in e-learning.
- **AENOR** (Spanish association for standardization and certification): It represents to Spain in ISO, and it has created the technic subcommittee CTN71/SC36 about information technologies similar to the ISO's.
- **EFQM** (European Foundation for Quality Management): Foundation of which aim is to improve the efficiency and effectiveness of the European organizations, reinforcing the quality in all aspects of their activities, as well as encouraging and assisting the improved quality.
- **EFQUEL** (European Foundation for Quality in eLearning): The aim of this organization is involving users and experts of a European community for sharing experiences about how to use the e-learning for improving the individual development, of organization, local and regional development, digital literacy and promoting the social cohesion.
- **QAA** (Quality Assurance Agency for Higher Education): British agency of verification of quality and academic standards of the universities.

3 Analyzed standards and models

The analyzed standards in this survey are included in [1, 2], so such sources are available for a more detailed description. These standards are showed in Table 1.
The aim of these standards is:

- **CWA 14644** [3]: This document defines a method for description and comparison of different approaches of quality in the virtual education. This standard analyzes and compares different quality models, focused on two main aspects: the processes of quality control and the transparency in the learning contents.
- **CWA 15533** [4]: This document complements the previous one, offering a metadata schema for describing any approach of quality for e-learning

(EQO Model) based on the fulfillment of certain criteria and belonging to categories.

Table 1. Main quality standards of e-learning

Standard	Organization	Year
CWA 14644:2003, Quality Assurance Standards	CEN	2003
CWA 15533:2006, A model for the classification of quality approaches in eLearning	CEN	2006
CWA 15660:2007, Providing good practice for E-Learning quality approaches	CEN	2007
CWA 15661:2007, Providing E-Learning supplies transparency profiles	CEN	2007
ISO 9001:2008, Quality management systems, Requirements	ISO/IEC	2008
ISO/IEC 19796-1:2005, ITLET Quality management, assurance and metrics,Part 1: General approach	ISO/IEC	2005
ISO/IEC 19796-3:2009, ITLET Quality management, assurance and metrics, Part 3: Reference methods and metrics	ISO/IEC	2009
EFQM Excellence Model	EFQM	1999
UNE 66181:2008, Gestión de la calidad. Calidad de la Formación Virtual	AENOR	2008
UNE 66181:2012, Gestión de la calidad. Calidad de la Formación Virtual	AENOR	2012
UNIQUE, European University Quality in eLearning	EFQUEL	2006
Code of practice for the assurance of academic quality and standards in higher education. Section 2: Collaborative provision and flexible and distributed learning.	QAA	2004

- **CWA 15660** [5]: It defines criteria according to which a project of quality management oriented to the virtual education is considered successful or not. Also, it contains practical examples of how to implant a correct management and a quality control in different organizations.
- **CWA 15661** [6]: It establishes a guide for helping the consumers of e-learning in making a decision about a product based on the information received, so they can find the product that meets their needs. Also, it offers guidelines for describing the information of e-learning products.
- **ISO 9001** [7]: It specifies the requirements for a correct system of quality management that can be used for internal application by an organization, for certifications or with contractual aims.
- **ISO/IEC 19796-1** [8]: It is the main standard in the quality of virtual education field. It harmonizes the variety of quality approaches used in learning and education. It also helps making decisions about choosing a product or another one, to quality representatives, system developers and users that find to develop their own quality approach.
- **ISO/IEC 19796-3** [9]: This document establishes a set of metadata for describing methods and metrics of quality in e-learning. It also includes a list with examples of methods and reference metrics.

- **UNE 66181** [10]: It offers a guide for identifying the characteristics of the virtual formative actions, so that virtual formation buyers can select the products that best meet their needs and expectations, and for suppliers to improve their supply and thereby satisfying their customers or students. It is a reference standard in Spain. A new version will be published at the end of 2012 year and it will contain five levels (based on UNE 66174[11]) for indicating the quality of these three factors: recognition of training for employability, learning methodology and accessibility.
- **EFQM Excellence Model** [12]: Its aim is self-evaluation of quality in an organization. It is not a specific standard of e-learning but many companies use this standard for improving their quality in management.
- **UNIQUe** [13]: It establishes a layer of quality for e-learning systems implanted in universities, with the aim of improving the reform process of European institutions of high education.
- **QAA Code** [14]: It offers guidelines for best practices for ensuring the academic quality in high education. The specification is divided into 10 sections, one of which is specific for e-learning.
- **ISO/IEC 30119** [15]: This standard is not published yet, it describes a quality framework for the life cycle of the e-Test (electronic test).

As accessibility is part of the quality, some standards related to accessibility [16] in e-learning have been analyzed although they will not be included in the comparison because they are not pure quality standards.

- **IMS AccLIP** [17]: *Accessibility for LIP* is the first of a series of documents published by IMS GLC (http://www.imsglobal.org) and it defines two new sub-schemas for the learner information package (IMS LIP [18], *Learner Information Package*). These two sub-schemas provide a method for specifying preferences of accessibility and adaptation for the users.
- **IMS AccMD** [19]: *Access for all meta-data specification* is a specification of metadata which try to facilitate the search of educative resources that meet the preferences or needs of the user (documented by AccLIP).
- **IMS GDALA** [20]: *Guidelines for accessible learning applications* is a report which provides guidelines for developing accessible e-learning applications. This document provides a framework for the distributed education community.
- **ISO/IEC 24751-1** [21]: This is the first part of this standard. This part provides a common framework for describing and specifying the needs and preferences of the learner and the description of the digital education resources. The 24751 standard is based on the IMS AccLIP and IMS AccMD specifications.
- **ISO/IEC 24751-2** [22]: This second part provides a common information model for describing the needs and preferences of the learners when they access digitally to a resource.

- **ISO/IEC 24751-3** [23]: This third part provides a common language for describing digital education resources for equating these resources with the needs and preferences of the learners.

4 Comparative analysis

The comparative analysis has been done with parameters which have been valued for each standard and model. These comparison criteria are based on [3] and they are the followings:

- **Organization**: It means the organization or association which has created the standard. Table 2 shows that ISO and CEN are the organizations that have published the most specifications and standards.
- **Orientation**: Each standard has been analyzed if it is products oriented or processes oriented. The result of the analysis shows, excepts UNE 66181:2008, that all standards are processes oriented although some of them are also applicable to products, e.g. ISO/IEC 19796-3. The new version of UNE 66181 will be oriented to products but it will have some minimum processes that should be implemented in an e-learning company in order to obtain the certification.
- **Scope**: It means if a standard is specific for e-learning or not. Most of analyzed standards are specific for e-learning. However, ISO 9001 and EFQM are used frequently in e-learning scope [24].
- **Certifiable**: It indicates if it is possible to get some standard certification, for ensuring to accomplish that standard. The generic standards (ISO 9001 and EFQM) have certification, but apart from these two, UNE 66181 and UNIQUe have also certification. ISO/IEC 19796 part 2 will be certifiable in a future.

5 Conclusions

The quality standards and models establish reference frames for helping to improve the management and assessment of the services, products and systems of e-learning. It is important to know the different approaches for creating standards related to the quality in virtual education, for selecting the most adequate for each situation. This paper has showed the result of a research process about the existence of quality standards applied to virtual education. As a consequence of this survey a first comparative analysis has been done, showing as main conclusions that practically all standards and models are oriented to quality management based on processes, most of them are not certifiable and there are a significant number of specific standards of quality for virtual education.

Table 2. Comparative analysis.

Standard	Organization	Orientation		Scope		Certifiable
		Product	**Process**	**eLearning**	**General**	
CWA 14644	CEN		x	x		
CWA 15533	CEN		x	x		
CWA 15660	CEN		x	x		
CWA 15661	CEN	x	x	x		
EFQM Excellence Model	EFQM		x		x	x
ISO 9001	ISO		x		x	x
ISO/IEC 19796-1	ISO		x	x		x (*)
ISO/IEC 19796-3	ISO	x	x	x		
UNE 66181:2012	AENOR	x	x	x		x
UNIQUe	EFQUEL		x	x		x
QAA Code	QAA		x	x		
ISO/IEC 30119	ISO	x	x	x		

(*) Part 19796-2 will be certifiable.

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