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Framework for a global quality evaluation of a website

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Abstract

Purpose – This paper aims to propose a high-level structure for a global quality evaluation of a website. This structure is based on the characteristics, sub-characteristics and attributes of three main dimensions (content, service, and technical quality) that will substantiate the development of broad website quality evaluation, comparison and improvement methodologies, according to particular sectors of activity and evaluator's perspective.

Design/methodology/approach – Based on the literature and the author's experience a framework is proposed for a global quality evaluation of a website.

Findings – Considering the results of some studies, as well as the systematisation of the knowledge available in several bibliographies, website quality can be grouped into three main dimensions: content quality, service quality, and technical quality. There has not yet been an evaluation methodology that focuses on these three main website quality dimensions in a broad and transversal sense.

Originality/value – The paper presents an innovative high-level structure for a global quality evaluation of a website, based on three dimensions not previously considered together.

Keywords Website evaluation, Content quality, Service quality, Technical quality, Service quality assurance

Paper type Research paper

Introduction

With the increasing number of websites and considerable investment in them, website quality evaluation has become an important activity (Naik and Tripathy, 2008). Organisations invest time and money to develop and maintain their website's quality. These websites should establish an effective information and communication channel between organisations and their clients. In some cases they are part of the offered product, since they make useful services available to clients (Grigoroudis *et al.*, 2008).

A website should clearly reflect the quality efforts made by the organisation, because it establishes an important connection with clients. Modern websites show a significant range of aspects, complexity of structure and diversity of offered services (Kappel *et al.*, 2006). As in all information systems, website evaluation is an important development and operational factor that may lead to the improvement of their users' satisfaction (Grigoroudis *et al.*, 2008) and to the optimisation of invested resources (Cheung and Lee, 2008).

In this research we propose an innovative high-level structure for a global quality evaluation of a website. That structure can become a platform for the development of specific website quality evaluation, comparison and improvement methodologies, according to different sectors of activity. We will thus introduce in the following sections the concept of quality, propose three main dimensions for website quality and identify methods for the quality evaluation in each of these dimensions. We will



propose the structure for a global quality evaluation of a website and, finally, we will offer some conclusions.

Software quality

People look for quality in each object they create, and software is no exception. Software is one of the strategic assets in the information society. With the internet boom, and the following exponential increase in contents and services made available through websites, a quality revolution quickly spread throughout the whole world (Naik and Tripathy, 2008).

Aspects related to the quality of websites have, therefore, become relevant to many sectors of activity. Several contributions to the field of website quality and different schools of thought have primarily focused on the definition of quality, its structure and how it can be measured (e.g. Jung *et al.*, 2004; Mich *et al.*, 2003).

In this paper we adopt the definition of quality published in the most recent International Organisation for Standardisation (ISO) standard for software quality, because it agrees with our purposes, because of its breadth and completeness and because of the prestige of that organisation. We, therefore, understand quality as the “capability of a software product to satisfy stated and implied needs when used under specified conditions” (ISO/IEC, 2005, p. 4).

Dimensions of website quality

Content and services are the reasons for the existence of a website, which is built by application of techniques and technologies. Thus, considering the results of some studies conducted and/or supervised by the author (e.g. Rocha and Victor, 2010), as well as the systematisation of the knowledge available in several bibliographies, we can group website quality in three main dimensions (Figure 1): content quality, service quality, and technical quality. This is an innovative conception of website quality.

In the first dimension the main concern is content quality rather than its existence, as this should be a technical quality concern. In content quality, attributes such as accuracy, completeness, relevance, opportunity, consistency, coherence, updates, orthography and syntax may be evaluated.

In the second dimension the focus is the quality of services offered in websites. In service quality, attributes such as security, reliability, privacy, performance, efficiency, accuracy, opportunity, availability, response time, time saving, empathy, reputation and personalisation may be evaluated.

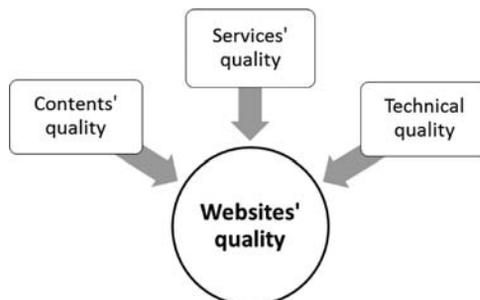


Figure 1.
Main dimensions for
website quality

Finally the third dimension focuses on the technical quality of websites, i.e. on quality attributes that are usually found in quality standards for software, such as ISO/IEC 9126 (ISO/IEC, 2001) and its successor ISO/IEC 25010 (ISO, 2011). Thus attributes such as navigation map, path, search engine, download time of pages, browser compatibility, broken links and accessibility may be evaluated.

By searching the literature and through our experience we have observed that there is no evaluation methodology that focuses on these three main website quality dimensions in a broad, integrated and transversal sense.

Content quality evaluation

Content quality evaluation primarily employs methodologies based on the Likert scale, which evaluates the quality of these contents amongst respondents (users, linguists and experts in the content presented in websites). Some studies related to this dimension are worth mentioning, such as Bernstam *et al.* (2005), Caro *et al.* (2008), Hargrave *et al.* (2006), Moraga *et al.* (2009), Parker *et al.* (2006), and Richard *et al.* (2007).

A possible structure for a content quality measuring instrument could have a similar format to the one presented by Moraga *et al.* (2009) (Table I), already aligned with the ISO 25012 standard (ISO/IEC, 2008), which is the most relevant contribution that we found in the literature for this dimension.

To classify each attribute the analysers should carefully read and analyse either the content of every webpage in the website or every webpage's content until a certain predefined level of depth is reached.

Analysers can classify webpage content quality in a five point Likert scale (1 = bad, 2 = mediocre, 3 = reasonable, 4 = good, 5 = very good).

Service quality evaluation

Online service quality evaluation, which includes, for instance, in the health area, healthcare scheduling, prescription renewal or drug acquisition, usually employs evaluation methodologies for back-office procedures and/or users' satisfaction with services available on websites. Some studies related to this dimension are worth mentioning, such as Al-Momani and Noor (2009), Arshad *et al.* (2007), Cernea *et al.* (2009), Hamadi (2010), Li and Suomi (2007, 2009), Parasuraman *et al.* (2005), and Zhao (2005).

A possible structure for a service quality measurement instrument could have the format presented in Table II, based on the service quality scale developed by Parasuraman *et al.* (2005), which is the most relevant contribution that we found in the literature for this dimension. The variables (second column) are grouped by characteristics (first column).

Analysers can classify websites services quality in a five point Likert scale (1 – completely disagree; 2 – disagree; 3 – do not agree or disagree; 4 – agree; 5 – completely agree).

Technical quality evaluation

The technical dimension is related to how the content and services are assembled and made available on a website.

Technical quality evaluation is based on software quality models or standards and on methods focused on usability, methods developed through studies in the area of

Point-of-view	Category	Characteristic	Subcharacteristic
Inherent	Intrinsic	Accuracy	Objectivity Reputation
		Credibility	
		Traceability	
		Currency	
		Expiration	
		Completeness	
		Consistency	
		Accessibility	
		Compliance	
		Confidentiality	
		Efficiency	
		Precision	
		Understandability	
System dependent	Operational	Availability	Interactive Ease of operation Customer support
		Accessibility	
		Verifiability	
		Confidentiality	
		Portability	
		Recoverability	
		Validity	
		Value-added	
		Relevancy	
		Specialisation	
	Usefulness		
	Contextual	Efficiency	Reliability Scope Applicability Flexibility Novelty Novelty Timeliness
		Effectiveness	
		Traceability	
		Compliance	
		Precision	
		Concise representation	
		Consistent representation	
		Understandability	
		Interpretability	
Amount of data			
Representational	Documentation	Organisation	
	Attractiveness		
	Readability		

Table I.
Structure for content
quality measurement

Source: Moraga *et al.* (2009)

human-computer interaction. The first group of methodologies include, amongst others, ISO/IEC 9126 (ISO/IEC, 2001) and ISO/IEC 25010 (ISO, 2011) standards. The second group includes an approach that emerged with the hypermedia nature of the internet and the relevance of interface conception to speed access to information and

Characteristic	Attribute	1	2	3	4	5
Efficiency	This site makes it easy to find what I need					
	It makes it easy to get anywhere on the site					
	It enables me to complete a transaction quickly					
	Information at this site is well organised					
	It loads its pages fast					
	This site is simple to use					
	This site enables me to get on to it quickly					
Fulfilment	This site is well organised					
	It delivers orders when promised					
	This site makes items available for delivery within a suitable time frame					
	It quickly delivers what I order					
	It sends out the items ordered					
	It has in stock the items the company claims to have					
System availability	It is truthful about its offerings					
	It makes accurate promises about delivery of products					
	This site is always available for business					
	This site launches and runs right away					
Privacy	This site does not crash					
	Pages at this site do not freeze after I enter my order information					
	It protects information about my Web-shopping behaviour					
Responsiveness	It does not share my personal information with other sites					
	This site protects information about my credit card					
	It provides me with convenient options for returning items					
	This site handles product returns well					
	This site offers a meaningful guarantee					
Compensation	It tells me what to do if my transaction is not processed					
	It takes care of problems promptly					
	This site compensates me for problems it creates					
Contact	It compensates me when what I ordered doesn't arrive on time					
	It picks up items I want to return from my home or business					
	This site provides a telephone number to reach the company					
	This site has customer service representatives available online					
	It offers the ability to speak to a live person if there is a problem					

Table II.
Service quality
measurement structure

Source: Parasuraman *et al.* (2005)

globally improve human-computer interaction, and includes standards such as ISO/IEC 9241 (ISO/IEC, 1998). This approach defines quality according to usability, considering the users' point-of-view (e.g. Jung *et al.*, 2004; Obeso, 2004).

Technical quality has received more attention from researchers than the other two dimensions, and several methodologies have been proposed for its evaluation. Amongst those, we consider the work developed by Olsina (2000) and other works that followed its lead (e.g. Machado and Rocha, 2008; Reis, 2004) the most relevant, since they base their methodologies on ISO/IEC 9126 (ISO/IEC, 2001) and its high level

quality characteristics that interest website users (usability, functionality, reliability, and efficiency).

Technical quality measurement can also be classified using a three or five-point Likert scale.

Structure for a global quality evaluation of a website

Bearing in mind the three main dimensions for website quality defined innovatively in this paper, resulting from literature synthesis and based on our experience as website users and website engineering researchers, we now propose a high-level structure to evaluate the global quality of a website in a broad, transversal and detailed way.

This structure is organised according to the three main website quality dimensions, comprising characteristics which, in their turn, consist of attributes, as shown in Figure 2. Characteristics can sometimes consist of more than one level of sub-characteristics.

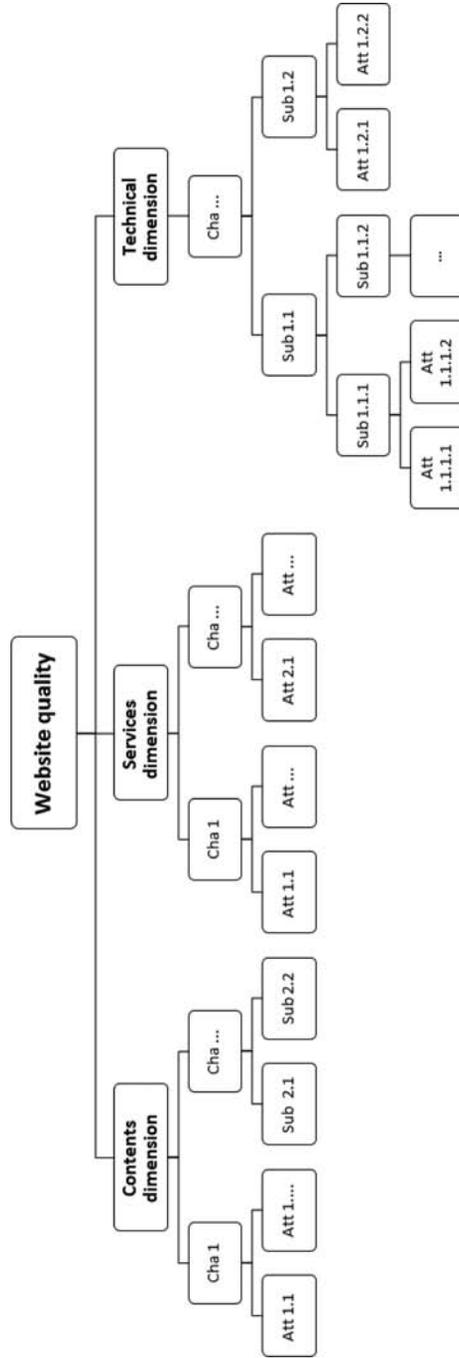
Website quality evaluation, comparison and improvement methodologies developed through the proposed structure should be designed to incorporate adjustments to the activity sector in which they are applied, since the suitable structure for quality sub-characteristics and attributes generally differs among activity sectors, and to incorporate adjustments to the type of evaluators (users, experts, or owners), since the suitable quality characteristics generally differ among them. For example evaluation methodologies from a user perspective should not consider the characteristics of portability and maintainability in the technical dimension. Simultaneously the methodologies must be configured without overlap between the characteristics, sub-characteristics and attributes of the three dimensions.

Conclusions and future work

In this paper we proposed an innovative high-level structure for global quality evaluation of a website. We can highlight a few aspects as a conclusion:

- (1) Website quality is strategically important for organisations and for the satisfaction of their clients.
- (2) Website quality should be based on the quality measurement of three main dimensions: content, service, and technical.
- (3) A structure based in these three dimensions, characteristics, sub-characteristics and attributes will substantiate a broad, integrated, transversal and detailed quality evaluation of a website.
- (4) A good evaluation, comparison and improvement methodology for website quality should comprise the three mentioned quality dimensions and allow adjustment to a specific activity sector and to a type of evaluator.

The next step in our study will be the development of an evaluation, comparison and improvement methodology for the quality of institutional and hospital websites, based on the high-level structure proposed in this paper and will be built and validated with help of web engineering experts and hospital website users. The need for this methodology is justified by the fact that we do not know of any that provide a broad and detailed assessment, integrating the three main quality dimensions of a website: content, service and technical.



Key: Cha – Characteristic; Sub – Sub-characteristic; Att – Attribute

Figure 2.
Part of the high-level structure for a global quality evaluation of a website

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