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The Quality of Kenyan University Websites: A Study for the Re-engineering of the Masinde Muliro University Website

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With the increasing uptake of websites by universities, competition is no longer limited to physical campuses but has also shifted online, where each university seeks to create a high quality website. Online promotion and communication is even more important for African universities, which are spread on large territories, as it presents an opportunity for them to promote their existence and achievements, collaborate with other institutions, and deliver online education to students. Challenges facing Africa's higher education institutions include: cultural differences, funding problems, language issues, and governance problems. In this paper we present the results of the evaluation of the website quality of three representative

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Kenyan universities. The study is based on an evaluation framework derived from a meta-model based on 7 dimensions. An in-depth evaluation was carried out using surveys, inspective analysis and automated tools. Results highlighted a number of critical issues and gave important suggestions for the improvement of the Masinde Muliro University (MMUST) website.

1 Introduction

Most universities worldwide have established a web presence in order to support their organizational goals. As the impact and the dependency on the web increases[1], so does the need to assess website characteristics and success. This is especially true in the education domain where different stakeholders depend on institutions' websites and thus expect them to be of high quality. For university websites, quality is a constant challenge and that is even truer for African universities that have to operate in large territories, addressing cultural differences, funding challenges, language issues and governance problems. In this paper we present a study whose goal was to evaluate the quality of the website of the MMUST, in Kenya to gather information useful for a re-engineering project. To this end, an in-depth analysis was realized including a comparison with other two Kenyan universities websites, Strathmore University and Masinde Muliro University of Science and Technology, which can be considered competitors.

There exist a variety of models for evaluating the quality of websites in different domains. General models have often been applied to assess the quality of academic websites, but they do not consider the requirements of specific stakeholders of the website under consideration (Mebrate, 2010). On the other side, models specialized to evaluate university website quality are tightly related to local university requirements (Olsina *et al.*, 2001) or focus only on specific quality attributes such as accessibility (Thompson *et al.*, 2003). Some models take into account a single viewpoint, most often students' (Zengin *et al.*, 2011). Few studies are based on criteria significant for web designers or experts. Among them, an evaluation of the home pages of top 100 world university websites (Yoo & Jin, 2004).

For our study, we adopted a systematic and multi-stakeholders approach to take into account that quality is multi-facet and that quality attributes must be evaluated according to the needs of a number of actors. To this end an integrated evaluation framework was defined. The framework includes three evaluation tables derived from a meta-model based on 7 quality dimensions (Mich *et al.*, 2003a) and the techniques identified as most suitable for the study.

[1] http://thewebindex.org/

2 The Evaluation Framework

Since stakeholders in a university have differing needs, background and experience in using websites, a framework for evaluating academic websites has to consider all their requirements, related to a variety of features. The stakeholders in a university website include: actual and prospective students, parents, academic and administrative staff, ranking organizations, web agencies, the general public and alumni, etc. and can be classified into three groups: users, developers and owners. A requirements analysis of these groups of stakeholders was realized with an extensive literature review and the authors' knowledge of the domain. The gathered requirements have been classified according to the 7Loci-meta-model, which gives a theoretical basis for quality evaluation, an issue often missed in existing studies (Zhang & Dran, 2001). The meta-model contains 7 dimensions corresponding to the loci or rhetorical topoi, which referring to the university context can be described as follows:

Content (What) refers to the information and is one of the most important dimensions of a university website, as it provides opportunity of enhancing learning and promoting the university, thereby encouraging enrollments, new funding, collaboration partnerships and reaffirming existing relationships (Franch *et al.*, 2000; Hall & Kennedy, 2004). To have a positive impact on its audience, content must be correct and possess an adequate level of detail (Kiyavitskaya *et al.*, 2010). Content evaluation considers how well the sites cover the domain in terms of the stakeholders' requirements, the information's value, originality, accuracy and reliability.

Services (Why) refer to the functionalities available in a website, and lead to the successful achievement of stakeholders goals. In this dimension, the proposed framework looks at services adequacy to users and owners goals; correctness, security, ethics, and privacy. Services that users expect from a university website include: enrolment and search facilities, e-learning systems, exam management, research publications and fees payment services. Most users may not know some of their needs and it is upon the developers to elicit them through an innovation process.

Identity (Who) is about the impression the site creates and it is critical because Identity design amplifies an organization's personality and attraction, and is a big part of the brand (Wang & Huang, 2009). We evaluate the site's identity based on: how the site conveys the university's image, the site's design, adaptation to the user through personalization of content and services, the site's brand, and logo strength.

Usability (How) concerns any aspect which enables a relatively undemanding use of the site in terms of time or cognitive input. It determines how efficiently and effectively the site's contents and services are made available to the

user, and involve the pragmatics of how a user perceives and interacts with a website. In this dimension, we evaluate: hardware and software requirements, people with disabilities, site's structure and navigation, download times, languages, and level of terminology.

Location (Where) concerns both the site's reachability and the user's ability to interact with the site and other users (Mich *et al.*, 2003a). Is evaluated by checking whether the university site has an intuitive URL, the site's ranking on site engines, the site's support for interactivity and if it provides functions for management of virtual communities or for participating in social networks.

Management (When) comprises all activities that guarantee proper functioning and operability of the site, in addition to updating the technology and adapting the site to new technical requirements.

Feasibility (With which means) under this dimension we consider the financial and human resources required to manage the site.

The proposed framework integrates innovation across different dimensions in terms of: creative content and site technologies, envisioning new services, making creative identity, for better site management, and in improving a site's reachability and interactivity. The 7 dimensions provided a way of classifying all website requirements and taking into account the diverse components coming together at a site in varying details (Mich *et al.*, 2003b). Requirements gathered in the first step of the study resulted in a set of characteristics formulated in form of questions classified into the 7 dimensions. These questions were divided into three tables: a table to be submitted to users and covering 4 of the 7 loci; a longer table to be submitted to domain experts, evaluating 2 more dimensions; other questions were submitted to developers, to gather data about technical issues and the popularity of the website, a proxy for the success of a website.

3 Application of the Framework to Kenyan University Websites

The multi-stakeholder framework described in section 2 was applied in a case study to 3 universities in Kenya: University of Nairobi (UON), Strathmore University (SU) and Masinde Muliro University of Science and Technology (MMUST)[2]. The tables were used to investigate the stakeholders' needs in a large scale survey and two inspective evaluations, respectively; some aspects were evaluated using automated tools. The first table was used to define a questionnaire that was submitted to different users while the other tables were used for inspective evaluation by experts. The target population consisted of students, lecturers and administration staff, together with experts (masters and PhD students in Computer science, Information Technology and Information Systems) from the 3 universities. The sampling employed both purposive and stratified

[2] www.uonbi.ac.ke, www.strathmore.edu, www.mmust.ac.ke

sampling techniques, and was done using proportional allocation method to each university (Ojino, 2013). To cater for the subjects declining to participate or dropping out, the study planned a sample size of 403 users and 10 experts. Respondents of both questionnaires had to assign scores to the individual sub-attributes questions using a 4 point Likert scale. The expert questionnaire also had some Boolean questions to check the presence of various quality sub-attributes. The questionnaires were validated using the Content Validity Index (CVI), retaining only questions that had a CVI of 0.75 and above. The final user questionnaire consisted of 13 items on 4 website quality dimensions; experts had 54 items on 6 dimensions. The last dimension, Feasibility was tested using automatic tools. The user questionnaire was then piloted on sample respondents at Great Lakes University of Kisumu; while the expert questionnaire was piloted at MMUST. Data was collected at the 3 universities from March to June 2012.

3.1 Results

User evaluation was very successful, with a redemption rate of 84.3%. Table 1 shows the results of the users' evaluations; percentages are related to the number of respondents who agree or strongly agree with the statements. SU website outperforms the MMUST website in many aspects; UON performances are better than MMUST, but most of them lower than SU, that could be used as a benchmark. Overall, the four dimensions of university web quality included in the user questionnaire correlated significantly with each other. Internal consistency of the Likert scale items in measuring the intended domain was also verified (the standardized reliability score was 0.858).

TABLE 1
Users' evaluation results

DIMENSION AND ATTRIBUTES	MMUST	SU	UON
CONTENT			
Rich and updated	41.3%	**92.3%**	70.6%
Ease of understanding information	70.5%	**100%**	96%
Important information	71.2%	**96.2%**	86.9%
Ease of finding information	48.1%	73.1%	**73.4%**
SERVICES			
Enrolment	15%	**69.3%**	67.3%
Assignment submission	25%	**65.4%**	35.4%
Checking results online	30.4%	**84.6%**	82.9%

DIMENSION AND ATTRIBUTES	MMUST	SU	UON
IDENTITY			
Appealing graphical design	57.5%	**80.7%**	75.7%
Adequate graphical design	55.1%	**84.6%**	72.4%
USABILITY			
Website loads its pages fast	54.4%	**77.0%**	62.9%
Access homepage from any webpage	74.7%	57.7%	**80.8%**
Links take one to where they expect	71.3%	**88.4%**	86.5%
Ease to navigate through the website	63.3%	76.9%	**78.8%**

As regard the experts' evaluations, Table 2 reports an extract of the results. SU and UON were better than MMUST in most of the aspects. From the results of the Boolean questions, the most critical is that none of the websites had a Swahili version, a feature that would help non-English users across Africa, therefore presenting a competitive advantage to the universities.

Alexa was used to check the popularity indexes of the competing university websites. The results highlighted a relation between Alexa popularity and the Webometric university ranking. UON, ranked first in Kenya, has the highest 'sites linking in' and the best 'traffic rank', followed by SU and MMUST. Each of the university websites was also analyzed for compatibility with WCAG 2.0 guidelines analysis level AA using a Checker Web Accessibility tool which found all the websites have accessibility problems. MobileOkChecker and MobiReady were used to check whether the competing websites can provide a functional user experience for basic mobile devices. None of the website's homepages passed all the W3C mobile web best practices.

TABLE 2
Experts' evaluation results

QUALITY ATTRIBUTE	MMUST	SU	UON
CONTENT			
Information matches aims of site owners	3.0	**3.6**	3.0
Information is credible	2.0	**3.6**	2.0
SERVICES			
Multimedia components are effectively used	1.6	**2.6**	2.0
Effectiveness in controlling content difficulty	2.6	**3.0**	**3.0**
Site feels secure	1.6	2.6	**3.0**
Errors are not encountered when using the site	1.9	3.0	**3.5**

QUALITY ATTRIBUTE	MMUST	SU	UON
IDENTITY			
Consistent use of logo across all the web pages	4.0	3.6	3.5
Eye catching images are used on homepages	3.3	3.6	**4.0**
Clear and noticeable logo on the homepage	3.6	**4.0**	**4.0**
USABILITY			
Optimum sitemap	2.7	1.8	**3.0**
Optimum internal search engine	1.7	**3.3**	2.5
Optimum help	2.0	**2.7**	2.0
Easy to understand symbols and terms	3.3	**3.6**	3.0
Assistant links in each page	2.6	**3.0**	3.0
MANAGEMENT			
Updated information on future events	1.5	**4.0**	**4.0**
Updated information for enrolment	2.1	**3.0**	**3.0**
LOCATION			
Possibility of users interacting with each other	**2.0**	**2.0**	1.5
Effective interaction channel user vs website	2.7	**2.7**	2.5
URL is intuitive and easy to remember	3.5	**3.5**	3.0

Conclusions

This paper proposed and applied an articulate framework for the evaluation of university websites. The framework is based on three tables obtained instantiating the dimensions of 7Loci meta-model including for each of them a number of attributes to be checked adequate to the evaluation goals. The tables were used to investigate the stakeholders' needs in a large scale survey and two inspective evaluations, respectively. The results of the application of the framework to three Kenyan university websites gave useful suggestions to be used in effectively addressing their critical aspects. From the point of view of the MMUST, the comparison with two competitor universities is also useful to prioritize the interventions on its website and to identify potential cooperation areas. Both the framework and the results contribute to a website quality management approach by universities. The framework has been designed for Kenyan Universities and its application to other African countries would possibly require some adaptations. With the proposed approach and a customized framework serving as a guide, universities in Africa could develop higher quality websites to achieve broader global recognition.

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