



A LITERATURE SURVEY: TOWARDS A FRAMEWORK FOR EVALUATING QUALITY IN ACADEMIC WEBSITES

James Kiprop Kosgey¹, Dr. Agnes Mindila² and Dr. Calvins Otieno³

**1 Jomo Kenyatta University of Agriculture and Technology, Nakuru Campus
Institute of Computer science and information Technology**

**2 Jomo Kenyatta University of Agriculture and Technology, Juja Main Campus
Institute of Computer science and information Technology**

**3 Jomo Kenyatta University of Agriculture and Technology, Kitale CBD Campus
Institute of Computer science and information Technology**

ABSTRACT

A quality academic website evaluation framework can be a powerful instrument for educational institution managers when determining the quality of their academic websites. Instead of leaving the all job of determining the quality of academic websites to web administrators. The availability of a quality evaluation framework for determining quality of academic websites can be a great tool to assist institutional managers to continuously monitor the quality of academic websites which remain to be the gateway of information to the various stakeholders. In this paper we survey the development of a website evaluation framework for academic websites that can be subjectively used to assign weights to each quality characteristic of an academic website in order to determine its Quality index. Quality can only be improved through a well-established quality evaluation framework yet the numbers of web quality models that can be used right away to evaluate quality in academic websites are limited. Therefore the degree of quality of service delivered and user satisfaction is a major concern for any learning institution. Quality frameworks inclined to academic institutions provide a solution to such cases of evaluation of academic websites to its managers. In this research we survey academic website evaluation frameworks as a lasting solution of determining quality of academic websites which are deemed as a popular means for sharing information and for communication .

Key Words: Quality Evaluation Frameworks, Academic websites.

1. INTRODUCTION

Websites are becoming key components for any organization to survive in the competitive globalized environment. The website as a whole represents an organization as well as communicating its culture, its values and the vision of an organization to the rest of the world. The website acts as a powerful delivery method for services that aid various activities and tasks that a stakeholder wants to carry out. It also acts as a platform that an organization can use to interact with its major stakeholders [5].

The continual intensified use of the internet, intranet and the WWW has had considerable effect on all sectors of the economy. The internet has turn out to be a very important considered weapon in the current day ever competitive business setting [19]. Complex and distributed systems and applications continue to emerge in the web environment this is majorly due to its increased popularity as well as in regard to the nature of the data and information available in the web. For any business or an organization, the website allows a great access to a large number of audiences and therefore assist improve its operations and efficiency [2]

The ultimate success of any website is greatly tied to its quality. The quality of a website is a vital matter which could evaluate the capability of the businesses to garner the benefits of being only.



Websites may well be linked with various problems such as erroneous navigation, broken links, consistency, outdated content. Better website design and excellent quality are majorly achieved through a thorough process of continuous assessment and evaluation of the web-based applications and consequently making improvements using those evaluations [9]. All these problems stated can be overcome by a quality evaluation framework for academic websites. This literature review has widely searched studies related to website quality evaluation that can be adopted or modified in academic website quality evaluation. The study also looks deeply into factors that are desirable to academic institutions as well as their sub characteristics.

2. THEORETICAL LITERATURE REVIEW

2.1 Website quality

There are various definitions of quality from varying perspectives and orientations. [1] Asserts that quality is distinct depending on the person perceivably doing the definition as well as based on the measures context applied and how it is considered. There are several definitions of quality that have been greatly cited. [16] States quality as “excellence”, [10] states quality as “value”, [12] describes quality as “fitness for use”, other definitions of quality include “conformance to requirement” [6] and “meeting and/or exceeding users expectations” [15]. Majority of the key Users normally demand for good quality and their resulting behaviour pattern is replicated in terms of an attitude development towards the merchandise consumption i.e. in regard of the number of visits to the site, which has clearly led researchers and analysts to regard quality as the most important factor for long term success and survival [19] Therefore quality majorly aims at satisfying the needs of the user at current time as well as in the future.

Quality is differentiable and branch from the expectations of users or clients. Hence, it is crucial to identify and give priority to expectations for such services and incorporate such customer expectations into a process for improving overhaul quality [5]. The process of evaluating and implementing quality is a very sophisticated complex process which requires several aspects to be taken into considerations. [13] Undoubtedly points out that overall Website quality is

considerably associated with and contributes to the overall satisfaction of consumers. Consumer contentment is based on the level of service quality delivered by the service providers which is determined by the consumer’s collective experiences at all of the points of transaction with company. This shows that there is some link between service quality and customer satisfaction which highlights that importance of customer satisfaction when defining of quality [20]. The same goes for an institutional website where users of the website are in the best position to evaluate the quality of delivery and the relevance of the services offered by the website.

2.2. Academic website critical success Quality factors

[12] asserts that the success of a website is in the long run based on the characteristics and tasks of the website components working together to create a website that can interact with users and provide user contentment. Several research works on website success has been done with each highlighting different factors necessary to build a successful website. Website quality is determined by several factors. There is generally no single attribute that defines the quality of a website. This section outlines the several key quality factors that were found to be more desirable to academic websites.

Usability - usability is greatly concerned with the easiness and how insightful it is for individuals to learn to use and relate with a website in order to easily accomplish their tasks [3]. Prior research suggests that high usability is associated with user-related positive outcomes, such as a reduction in the number of user errors and a more positive attitude toward the website [8]. [17] Asserted that usability characteristic as described by ISO 9126-1 model varies for websites of different domains and hence to evaluate usability of academic websites common set of metrics cannot be used. The users should be able to predict which section of the website contains the information that they are looking for very fast, the home page should be appealing so as to make the website users want to explore it further, and that the website should have characteristics that make it appealing e.g. the links, graphics etc.

Functionality- According to [21], functionality deals with how the users relate with the site for



services and the site's delivery. It is the technical application processes behind the scenes. This means that an academic website should do what it is needed to do, while usability relates to the question of how well users can use the function.

Efficiency- According to [18] efficiency is concerned with the number of clicks that a user makes so as to complete a particular tasks as well as how much time a user takes or how many actions a user will perform to complete a task or reach a particular goal. Efficiency is an important skill in avoiding time wasting and effort. It is important therefore to incorporate programming techniques that will make the implementation and maintenance of your website efficient [17]. Users of academic websites expect specific type of information in the website and a short period of time to access the information they want. These indicates that the users of academic websites are concerned more about whether or not they can find the information they are looking for or not and how long it would take them to find that particular information.

Reliability- [16] describes software reliability as a computer program with failure free operations working in a stated environment over a specified duration of time. An academic website should be designed in such a way that they do not allow an intentional operation failure, wrong information and transaction errors to occur.

Availability- According to [16], availability of a website is the measure of the percentage of time that a website application is available for use. In reality, unscheduled downtime happens and often times it is due to factors beyond the organization's control. Disgruntled customers always have ripple effects on the use of the website in that the negative experience is shared with other consumers who in turn disseminate the same information to other consumers causing a long-term and at times irreparable damage to the organization [18].

Security- Security is paramount when developing an academic website application. News articles daily report on security vulnerabilities and hacking attacks of online applications [10] This has caused consumers or users to be more concerned about misuse of their personal information and many are mistrustful of the security protection that organizations and institutions are employing. Organizations need to devote more resources to protect information on the website and that information security is a top concern in

management, in its various forms, information is arguable the most important asset [9].

Content Quality- Content is a critical part of the website. It is the reason as to why users visit the website. The importance of this characteristics has been noted by most authors with a motto "Content is king". Users in an academic website come looking for particular information. This is because the users have what they are looking for in mind before coming to the website and so they give less attention to other aspects such as the website design [12], hence the inclusion of this aspect in assessing the academic website.

2.3 Website evaluation using quality frameworks

A framework is built on a set of attributes around which to a frame and structure appraisal questions that might be asked in a piece of website in order to critically assess its quality and In each case, a set of quality indicators is listed, that is, features that will help to form a judgment. [13] Defines a Quality Framework as a framework with the objective to describe, assess and/or predict quality. [14] Further defines Quality Framework as a framework to define, evaluate and improve quality. This usually includes a quality Meta framework as well as a methodology that describes how to instantiate the Meta framework and use the framework instances for defining, assessing, predicting and improving quality

Quality frameworks have always been used as a basis of website quality evaluation, coding standards or guidelines [13] Quality frameworks provide direct recommendations on approaches to evaluate websites' quality as well as approaches to improve website quality. A quality framework is the basis of all quality measurements, that is, for measuring the activities, the all site, and the general website interface [11].A framework generally encompasses quality criteria for characterizing the quality attributes of a website product.

2.4. Aspects in Quality framework development

For one to effectively assess the quality of a website, it is essential to craft a website quality evaluation method. A well-defined approach will provide a structure for the website quality evaluation framework, website quality criteria and quality evaluation procedure. The results will be a group of scores which relate to a substantial range of "quality characteristics" features and the



appropriate to the radical live-website quality requirements.

According to ISO/IEC 25000:2005, a quality model (QM) is a “defined as a set of characteristics, and of relationships between them, which provides a framework for specifying quality requirements and evaluating quality.” Each sub-characteristic may be further hierarchically decomposed. Quality characteristics and sub-characteristics at any level should be measurable, either directly or indirectly, through a set of associated measurable properties.

2.4.1. Defining Top-level quality characteristics

The initial aspect in framework development is the development of top level quality characteristics [16]. Each quality top level characteristic can take a real value-the measurable and computable value. This value represents the outcome quality, which can be interpreted as the degree of satisfaction required [22]. The top level characteristics are defined through in-depth document analysis, data analysis, use of conceptual framework as guide, effects of new technologies used in a website as well as guidance from experts [22].

It is necessary to effectively classify quality characteristics that are suitable to academic websites. Once these top quality level characteristics are carefully identified, they are then broken down into the lower levels sub characteristics that can be refined into a set of measurable indicators of academic websites’ quality.

2.4.2 Defining lower-level quality sub characteristics

Quality sub characteristics are lower level quality criteria that break down its parent characteristics to more measurable criteria. Once the quality top level characteristics are defined, they are broken and refined into a set of measurable sub characteristics. The quality sub characteristics scoring formulae should be defined, with every relative indicator considered by means of weights.

Each quality top level characteristic has a list of sub characteristics which should add up to the overall quality weight of the overall top level characteristics. The definition of sub characteristics is less critical. Once the top level framework is stable and well understood, the lower levels can be tailored to specific contexts and improved over

time, as experience in the use increases and web applications evolve [17]

The sub characteristics should be tailored and defined to specifically academic sites. This is the case, for example, for functionality and content quality, which should be specialized to particular functions and content supported by academic websites. ISO 9126-1 standard explains that the set of sub characteristics associated with a characteristic should be selected to be typically representative concerns without being exhaustive, and should describe that attribute.

[22] Asserts that a website quality framework should start from a very general top level characteristic mapped to several factors responsible for quality to specify of a website. The framework developed defines characteristics down to the second level sub characteristic, majorly tailored to academic sites.

2.4.3 Attaching Weights to lower-level quality sub characteristics

Some quality sub characteristics are deemed more important than others and therefore it’s quite relevant to differentiate those sub characteristics that carry more weights in the quality evaluation of an academic website. This is only possible by attaching weights based on the desires attached to each sub characteristic based on the data collected in this research work.

Websites Quality weights are determined by a measurement method and a scale to it, with Likert Scales being the most commonly used [23]. In Website quality weights generation, [24] proposed a compliance framework that can be modified for websites; this can be modified to suit academic websites as follows:

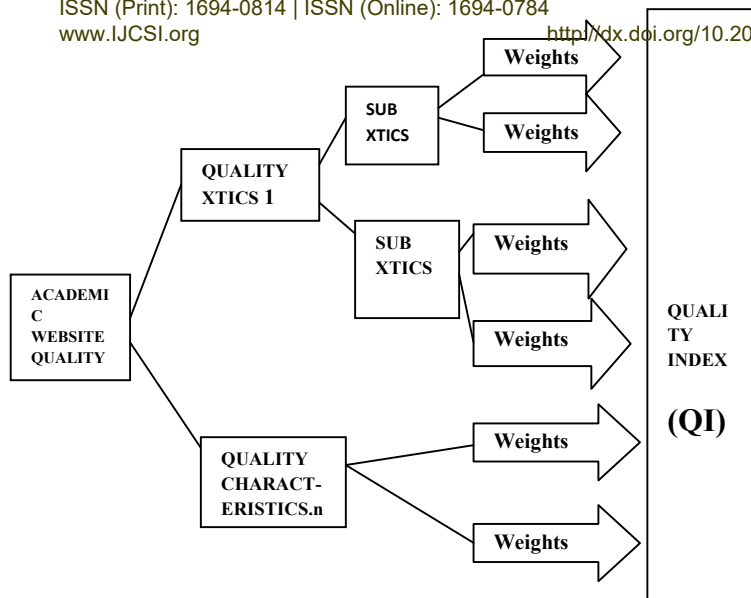


Figure 1. Modified Quality Compliance Framework (QCF) [24]

Website quality index is the final quality indicator of an academic website. The Quality index can be calculated as follows using the following various components of the QCF.

$$\frac{\text{Quality Characteristics score}}{\sum \text{Sub Characteristics attached Weights}} = \frac{\text{No of Subcharacteristics}}{\text{Possible Score}} \quad (1)$$

$$\frac{\sum \text{Quality Characteristics weights}}{\text{Possible Score}} = \quad (2)$$

2.5. Existing Website quality frameworks

There are several website design guidelines, quality models and assessment techniques that have been developed and used for designing and evaluating websites. Even though the design guidelines have been widely adopted and used in improving the design and development of websites, quality models and standards are not largely used. These quality models neither have particular properties of websites focused on particular domains nor do they consider different users point of view [12]. Several models have been proposed for evaluating quality service delivery on websites of which they have a varied theoretical foundation [7].

Using these models, a suitable quality assessment framework for educational institutions’ websites will be developed. Instead of building an assessment framework from scratch, these criteria and techniques will be used as a base to develop a website Quality assessment framework. The



following are some of the commonly used frameworks for evaluating both software and websites:

Web – QEM - This model has been used to assess how web applications help to meet quality requirements in new Web development projects and to evaluate requirements in operational phases. It helps discover absent attributes or poorly implemented requirements, such as interface-related designs, and implementation drawbacks or problems with navigation, accessibility, search mechanisms, content, reliability and performance, among others. The Web QEM evaluation is a tool that is evaluator-driven, done by the domain experts rather than the users. This method is more objective than subjective and it is quantitative and model centred [9].

Web Quality Model (WQM) - [19] present the Web Quality Model (WQM), which is intended to evaluate a Web application according to three dimensions: Web features (content, presentation, and navigation); quality characteristics based on the ISO/IEC 9126- 1 (functionality, reliability, usability, efficiency, portability, and maintainability); and lifecycle processes (development, operation and maintenance) including organizational processes such as project management and reuse program management. Although WQM model do not tend to be practical in usage, it is extremely useful in setting up the stage for discussion on whether development process should be involved in the evaluation process.

MiLE Lugano model- This model proposes a technical inspection for evaluating application independent aspects. It suggests to use user-experience and scenario based testing for the application dependent aspects of a website [21]. This model is a usability focused evaluation method based on the combination of inspection from expert evaluation and user empirical testing. The evaluation method in this model include: Content, services, navigation, cognitive features of the interface, aesthetic/graphical level and technology used.



SERVQUAL model- SERVQUAL model is an empirically derived method that has been used by a services organization to improve service quality. The method involves the development of an understanding of the perceived service needs of target customers. These measured perceptions of service quality for the organization in question, are then compared against an organization that is "excellent".

ISO 9126-1 quality standard model- The ISO 9126-1 presents a quality model that describes six categories of software quality which are relevant during product development that include functionality, reliability, usability, efficiency, maintainability and portability. In ISO 9126-1 quality in use indicates the effectiveness, productivity, safety and satisfaction of users in the actual context of usage rather than measuring the quality of the software [8]. Moreover all the three approaches are inter-related. The ISO 9126-1 model therefore act as a starting point for conducting website evaluation, it can be adopted to include essential quality characteristics of academic website under study, so to speak.

Tsigereda Framework- [12] designed a website quality evaluation framework for academic sites from student's perspective. In his study he proposed a new and improved quality evaluation framework consisting of five high level quality factors (Content, Usability, Reliability, Efficiency and Functionality), hierarchically arranged into sub quality factors and criteria. This framework is closely linked to a better and more modified evaluation framework that can be used in evaluating academic websites based on the various literature reviews carried out in this study. Nevertheless, the framework only focuses on one group of academic websites that is from student's point of view thus the framework fail to include other stakeholders in the evaluation task. It could have been much better if the framework gathered for other evaluators such as web administrators, web developers and other concerned stakeholders of an academic website. This would ensure that the monitoring of quality can be done as early as during development.

The framework also consists of a list of hierarchical list of quality factors. After generating quality factors and sub factors, it

would be interesting if the author developed a tool to ease evaluation.

2.6. RELATED WORK

There are several number of previous works related to specific characteristics of websites like usability and accessibility. Previous studies carried out to evaluate the general quality of academic websites are quite few. Selected previous studies are described in this section.

Educational websites were studied from different perspectives. For example, Lautenbach.et.al evaluated usability of a university website using two defined criterion for usability: survey ability (user perception of satisfactory layout) and find ability (observed ease of use), while other studies took specific features of websites. A good example is a study that designed criterion for evaluating scholarly web resources within the art history field [14]. It outlined quality factors such as content, authority, organization and accessibility. A similar study conducted to evaluate the usability of Lund University's research and home pages outlined quality factors in two categories: user experiences and website success. Under user experience we have quality characteristics such as usability, functionality, content and branding. It outlines quality characteristics such as design, content, navigation and web technology as part of the second category. Design indicates the layout of the website, appropriate use of graphics, animation and media used to assist the presentation of content. Content indicates obviously the quality of information the website offers.

As a sub factor, it consists of the understandability of the language, attractiveness of the presentation. Navigation indicates the methods of navigating in the website, menu types, and link names that help users to easily move around the website. Web technology indicates the models and standards used in the website [20]

[2] did a study on usability evaluation study on academic websites of Jordanian university and listed out quality factors in six main categories; Content, organization and readability, Navigation and links, User interface design, Performance and effectiveness and Educational information

[17], did an empirical study to assess how the student's acceptance of course websites is



influenced by the usefulness and ease of use paradigm of websites, the study which took website usage as an acceptance measure revealed that website usefulness has direct impact on the acceptance of course websites.

The study further emphasized that educational institution should give focus on ease of use and the usefulness of course websites. Further, the study identified three critical determinants of course websites ease of use, that is, Consistency, Flexibility and efficiency, Interactive facilities to help communications, Availability of essential course materials and Understandability

[14] Did a case study where he applied the Web QEM quality model in evaluating six well known academic websites located in four different continents and identified 4 main quality factors: usability, functionality, reliability and efficiency as the main quality evaluation model quality characteristics. These factors were further divided into sub factors and attributes forming a quality tree consisting a total of more than 121 factors.

RECOMMENDATIONS

The review indicates that although there are several website quality models currently available, most of them only provide broad website quality factors and only few are designed for the purpose of evaluating websites in particular domains like museums tourism, hotels, government and commerce or business. However, the number of website quality evaluation models that can be used right away for evaluating the quality of an academic websites is limited. As a result, the general quality models are used to evaluate the quality of academic websites. The general website quality evaluation models do not consider the requirements or needs of specific users of the academic websites under evaluation, except listing broad quality factors and sub factors. An institutions website is a gateway to its information, products, and services and as such it should reflect the needs of the clients it serves. Hence this review recommends that it is necessary to create a comprehensive website quality evaluation framework that is applicable to academic websites.

CONCLUSIONS

This study has addressed the questions of how a weighted academic website quality evaluation framework can be developed. Lack of a quality evaluation tool has made it difficult to know which aspects of an academic website needs improvements from consumers point of view. Based on the findings of this study a quality evaluation framework should be developed to take care of the quality perspectives of an academic website. If the consumers are satisfied with the quality characteristics of the websites then, their needs are met hence they are satisfied by the services delivered by the website. A quality website will have high returns on investments thus the website would attract more visitors who could be potential students, sponsors or lecturers.

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James Kosgey is a Master of Science in Computer Systems student at the Jomo Kenyatta University of Agriculture and Technology. His current research interests are in Web Frameworks and is currently doing a research titled 'A Website evaluation framework for determining Quality in academic Websites'

Dr. Agnes Mindila is a lecturer at Jomo Kenyatta University of Agriculture and Technology. She Holds a PHD in Information communication technology from the same institution and a Masters Degree in Information Technology Management in Information Technology Management from University of Sunderland, UK.

Dr Calvins Otieno is a lecturer at Jomo Kenyatta University of Agriculture and Technology (JKUAT). He holds a PHD in information Technology and a Msc. in software Engineering.