

A Preliminary Study on Website Design Quality Factors from User's Perspective

Trivikram Mulukutla¹, Dr. K.Sreenivasa Rao²

¹ Research Scholar in Computer Science, Rayalaseema University, Kurnool, Andhra Pradesh, India

² Professor, Department of OR & SQC, Rayalaseema University, Kurnool, Andhra Pradesh, India

Abstract

A global network of networks is an internet. One of the most popular services of internet is WWW, which contains huge volumes of data for user needs. User's browser for variety of information through websites only. If website is designed according to W3C standards, user can feel free ease of use. To be more effective with respect of its performance in terms of relevancy, developers must evaluate for complexity and usability issues. This paper concentrates on previous studies of website designing and hindrances found by user while browsing.

Keywords: Browser, Complexity, Internet, Network, Usability, Website Design, WWW.

1. Introduction

Internet is information super highway. Many definitions reflecting that internet is a global network of networks. Few people used to work on internet world wide before the existence of World Wide Web (WWW). Internet became so popular with the introduction of WWW in 1993. WWW is one of the dynamic services of internet which contains high volumes of information that is useful to various types of users all over the world. Initially WWW used to provide information sharing only. Later it's applications extended to provide services in Educational, Health, Defense, E-Commerce, social networking and Research fields.

Now-a-days people are using Web to extract the needed data and information as it contains huge volumes of data readily available. People are spending much more time on specific websites for extracting relevant information. From developer's perspective, website design and development must fulfill the needs of the users. Web developers must create a user friendly environment for a user to browse the entire website. In this aspect most of the web users facing problems while browsing, like

1. Not finding relevant websites as per their web request.

2. Not finding relevant information within the website, even though web title/URLs meets the user query.
3. In spite of needed information is available, finding difficulty in navigating among the pages.
4. Some links may not take to a right page and some more links may not link any page.
5. Web page may not be rendered properly due to improper use of the HTML tags and script elements
6. Site downloading time may be high etc....

Such problems may lead to raise questions on website designing and development quality.

Before making a website online, it's developer's responsibility to evaluate the complexities and usability issues if any. Even though well trained professionals are developing websites, web users are still facing all the problems as above mentioned. If websites are designed and developed as per W3C (World Wide Web Consortium) standards, most of the browsing time problems can be reduced. Developers must follow a systematic process to evaluate a website quality based on usability and complexity metrics.

2. Preliminary Study

Visiting websites of information access is a part of our everyday life and are also used to exchange and convey information between user communities. Such information conveyed comes in different formats, languages and incorporates with text, images, sound, and video. Despite of website proliferation, assessment of website quality remains a challenging area of research. Quality relates to the level of accomplishment of user expectation when interfacing a website and also customer satisfaction with. International Standards Organization (ISO) standards 14598-3 and 9126 incorporate models, which focus on general external characteristics of a software that must be accomplished when it is in use. The two standards captures the external characteristics, but fail to internal characteristics accountability that arise during the process

of creation. As discussed in this article, quality captures user perceptual aspects, likely to be involved in website interaction. These aspects concentrate on the cognitive royalty and of a site, are qualitative and are subjectively assessed by the user community in terms of relevancy. Such aspects focus on quality maps of customer satisfaction assessment and contribute to the emergence of website quality in the area of usability and complexity metrics and perceptual user traits. This literature study identifies several aspects which are often aggregated like

1. Content
2. Navigation
3. Design and structure
4. Appearance and multimedia
5. Uniqueness

We used the above criteria as a starting point. These criteria were further decomposed to sub-criteria to formulate an architecture model able to capture user's perception about quality while using website. Quantitative assessment about criterion and sub-criterion weight values was motivated via the use of the Analytic Hierarchy Process, or AHP for short. Then we applied these criterions hierarchy and assessed website quality of the 10 Andhra Pradesh government websites. Assessment of website quality was achieved via the judgment elicitation by 50 site users. Users were first asked to assess criterion and sub-criterion weight values and then to use these values to assess about each website quality preference. During assessment identity of organizations was hidden and tagging was random. Orientation was not towards the assessment of website quality but was used to enable and facilitate quality criteria definition and validation. However, research orientation was towards criteria definition, criterion weight value assessment and ultimately quality model validation.

3. Quality Assurance

Web, as been identified as the fastest adopted technology, but often the websites quality is unsatisfactory, and basic web principles, like interoperability and accessibility, are ignored or scarcely considered by designers. There are many reasons for the scarce quality, in spite of the attention paid to the quality in other sectors like Software Engineering. Among the others we can certainly mention:

- rapid evolution of technologies
- mix of technologies
- easy of writing HTML “tolerance” of browsers, which display even non correctly coded pages.

The last two points, and the presence in the development teams of several professionals, not ., necessarily with a specific background, have certainly been among the reasons of the diffusion . of the web. However, as a result, scarce attention external characteristic, while developers and has been paid to the internal quality. The evolution of the Web towards a more complex XML based architecture requires greater attention to the correct usage of technologies and a higher skill. In addition, national regulations are more and more requiring that web sites are accessible and usable (for the Italian case, see [Signore2004]). Quality Assurance activity makes a site functions correctly It encompasses two main areas like data collection and data analysis.

3.1 Data Collection

In this area data is gathered which a site can be examined for quality issues. In practical terms, it requires a site to validate against a series of checkpoints, such as:

- Broken links.
- Missing content, e.g. images.
- Missing page titles.
- Content spelling and grammar.
- Missing metadata.
- Page file sizes.
- Browser compatibility.
- Applications functionality, e.g. online forms.
- Server Side scripting errors.
- Data protection and privacy.
- Website Design standards maintaining.

3.2 Data Analysis

Data Analysis examines all the collected and from that an 'Issues Log' is compiled. The purpose of this 'Issue Log' is to set-out all items found in violation of a quality assurance checkpoint like broken links, oversized images, etc. These further can then be assigned to a developer for adjustment.

Although it is a repetitive essential activity, Quality Assurance can be very labor-intensive. This is especially for websites which are large in size and their dynamic content.

3.3 Web Site Quality Assurance

Website Quality Assurance describes the process of enforcing standards regarding quality control and working to improve the processes that are used in developing the web sites components, infrastructure and its content. When QA is well implemented, a web site should seem to be improvement progressively in terms of both reducing of defects rate and increase in site usability and performance. Quality assurance should function as a user voice, a reminder to the developers and designers that the site is designed for user's convenience. Quality Assurance would be a positive force for a user quality experience. It is often that the best designed and developed sites will experience problems and failures. This makes every organization launching their website must accomplish the quality assurance more effectively.

3.4 Focus on Improving Processes

The way how we understand quality assurance understands the process emphasis. Quality control mainly focuses on the web sites come out creation process. Quality assurance focuses on the creation process input, process itself as well as the quality of output by improving every factor influencing its quality. Quality assurance looks beyond the structured test cases used to control quality because these are necessarily limited. QA focuses on more a site's ability to meet user requirements and refines by eliminating the problem areas. QA should be involved in the development of new design process before they are finalized towards usability and user experience factors. Quality assurance must be involved in user's service and support communications so that usability defects can be reviewed. With the user's input, quality assurance can refine user scenarios to better match "real-time" behavior. There is a developing area to check whether the tools used to create and maintain a web site appropriate for user's tasks. After completing the development phase, review the success of the changes in terms of design factors like image size, hyperlinks, file sizes and content could be made more efficient.

3.5 Focus on Tracking Problems

Quality assurance also involves defects and their resolution during the process of quality control. Problems are discovered and typically reported and handed off to the developers and designers based on the identified problem area with the defects. Quality control can be a binary process which something passes, or fails or sometimes

"bounced" back to the team responsible for fixing it enough and tested again.

QA identifies the problems discovered through using quality control test cases, and also finds problems which are uncovered through more general website reviews and ad-hoc consistency and usability testing. In addition, QA also identifies certain areas for improvements by using user input as a great source for such opportunities. QA should log reported problems as the priority and scope, and report the same to the testing area so that they can be redesigned and refined

4. Research Scope and Methodology

In this section, we identified certain objectives of this research and made necessary to develop a theoretical, comprehensive, and measurable architecture framework for assessing the websites quality in order to provide straight forward criteria to encourage website improvements in design and its implementation. Furthermore, the aim is to develop an architecture framework that is capable of reliable applications across a range of websites regardless of the service they provide. A multi-phase approach was adopted that included a study of wide range of literature reviews, published. Our research identified the importance of algorithms which are needed for assessment of website quality in terms of usability and complexity metrics. In this scenario we have to select some sample websites for their quality assessment. In each of such websites, Website quality evaluation must be done according the following guidelines.

1. Represent any non-text element as text equivalent.
2. Give less preference to color scheme.
3. Replace images with markups and style sheets to convey information
4. Use natural language to mention text.
5. Use table properties in the web document.
6. Ensure that webpage featuring new technologies transform gracefully.
7. Ensure user control of time sensitive content changes.
8. Ensure direct accessibility of embedded user interface.
9. Design for device independence.
10. The information must be closely related to the context.
11. Provide clear navigation mechanism.
12. Ensure that documents are clear and simple

5. Future Enhancements

However, research orientation was towards criteria definition, criterion weight value assessment and ultimately quality validations through existing or newly framed models. We, keeping in mind how quality assessment of a

website depends on its evaluation results made us to work on a specific architecture and certain algorithms which are perfectly applicable for website quality evaluation propose.

6. Conclusion

It has been observed that, user satisfaction in terms of data access depends on website design quality. This concept brings us to a new area of research to frame architecture for representing website structure and need algorithms to evaluate its quality. By using existing architectures for by developing algorithms and implementing them to website quality assessment has to be done.

References

- [1]. Berendt, B., Hotho, A., Stumme, G.: Towards Semantic Web Mining. In: *The Semantic Web - ISWC 2002*, ed by Horrocks, I., Hendler, J.A., First International Semantic Web Conference, Sardinia, Italy, June 2002. Lecture Notes in Computer Science, vol 2342 (Springer, Berlin 2002) pp 264-278.
- [2]. Berendt, B., Spiliopoulou, M.: Analysis of Navigation Behaviour in Web Sites Integrating Multiple Information Systems. *VLDB J.* 9(1), 56-75 (2000).
- [3]. Bias, R.G., Mayhew, D.J. (eds): *Cost-justifying usability* (Academic Press, Boston, MA 1994).
- [4]. Blackmon, M. H., Polson, P.G., Kitajima, M., Lewis, C.: Cognitive walkthrough for the Web. In: *CHI'02, International Conference on Human Factors in Computing Systems*, Minneapolis, USA, April 2002 (ACM, 2002) pp 463-470
- [5]. Brajnik, G.: Using automatic tools in accessibility and usability assurance. In: *ERCIM UI4ALL*, ed by Stephanidis, C., 8th International ERCIM Workshop on User Interface for All, Vienna, June 2004. Lecture Notes in Computer Science vol 3196 (Springer, Berlin 2004) pp 219-234
- [6]. Brooks, P. Adding value to usability testing. In [51] (1994) pp 255-271
- [7]. Ceri, S., Fraternali, et al.: Architectural Issues and Solutions in the Development of Data-Intensive Web Applications. In: *CIDR'03, First Biennial Conference on Innovative Data Systems Research*, Asilomar, USA, January 2003 (2003)
- [8]. Ceri, S., Fraternali, P., Bongio, A., Brambilla, M., Comai, S., Matera, M.: *Designing Data-Intensive Web Applications*. (Morgan Kaufmann, San Francisco, CA 2003).
- [9]. Ceri, S., Fraternali, P., Matera, M.: Conceptual Modeling of Data-Intensive Web Applications. *IEEE Internet Computing* 6(4), 20-30 (2002)
- [10]. Cooley, R.: The use of Web Structures and Content to Identify Subjectively Interesting Web Usage Patterns. *ACM TOIT* 3(2), 93-116 (2003)
- [11]. Cooley, R., Mobasher, B., Srivastava, J.: Data Preparation for Mining World Wide Web Browsing Patterns. *Knowledge and Information Systems* 1(1), 532 (1999)
- [12]. Cooley, R., Tan, P., Srivastava, J.: Discovery of Interesting Usage Patterns from Web Data, *International Workshop on Web Usage Analysis and User Profiling*, San Diego, USA, August 1999, vol 1836 (Springer, Berlin 2000) pp 163-182.
- [13]. Doubleday, A., Ryan, M., Springett, M., and Sutcliffe, A.: A Comparison of Usability Techniques for Evaluating Design. In: *ACM DIS'97, G.C., Henderson, A., Coles, S., Symposium on Designing Interactive Systems: Processes, Practices, Methods and Techniques*, Amsterdam, the Netherlands, August 1997 (ACM, New York, 1997) pp 101-110 .
- [14]. Fraternali, P., Lanzi, P.L., Matera, M. Maurino, A.: Model-Driven Web Usage Analysis for the Evaluation of Web Application Quality. *Journal of Web Engineering* 3(2), 124-152 (2004)
- [15]. Fraternali, P., Matera, M. Maurino, A.: WQA: an XSL Framework for Analyzing the Quality of Web Applications. In: *IWWOST'02, Second International Workshop on Web-Oriented Software Technologies*, Malaga, Spain, June 2002 (2002)
- [16]. Garzotto, F., Matera, M.: A Systematic Method for Hypermedia Usability Inspection. *New Review of Hypermedia and Multimedia*, 6(3), 39-65 (1997)
- [17]. ISO (International Standard Organization). *ISO 9241: Ergonomics Requirements for Office Work with Visual Display Terminal (VDT)-Parts 117* (1997)
- [18]. Ivory, M.Y., Hearst, M.A.: The state of the art in automating usability evaluation of user interfaces. *ACM Comput. Surv.* 33(4), 470-516 (2001) *Web Usability: Principles and Evaluation Methods*.
- [19]. Ivory, M. Y., R. R. Sinha, M. A. Hearst: Empirically Validated Web Page Design Metrics. In: *ACM CHI'01, International Conference on Human Factors in Computing Systems*, Seattle, USA, April 2001 (ACM, New York 2001) pp 53-60
- [20]. Jeffries, R., Desurvire, H.W.: Usability Testing vs. Heuristic Evaluation: Was There a Context? *ACM SIGCHI Bulletin*, 24(4), 39-41 (1992)
- [21]. Kantner, L., Rosenbaum, S.: Usability Studies of WWW Sites: Heuristic Evaluation vs. Laboratory Testing. In: *ACM SIGDOC'97, International Conference on Computer Documentation*, Snowbird, USA (ACM, New York 1997) pp 153-160
- [22]. Lynch, P., Horton, S.: *Web Style Guide: Basic Design Principles for Creating Web Sites*, 2nd edn (Yale University, 2001)
- [23]. Madsen, K.H.: Special Issue on "The Diversity of Usability Practices". *Comm. ACM*, 42 (5) (1999)