

Tool for measuring 'Quality in Use' for Websites of Punjabi and Hindi Newspapers: PH.WUQT

Rupinder Pal Kaur

Post Graduate Department of Computer Science

Sri Guru Gobind Singh College

Sector 26, Chandigarh

sandhu_18@yahoo.com

Vishal Goyal

Department of Computer Science

Punjabi University

Patiala

vishal.pup@gmail.com

Abstract— *Quality is difficult to define and measure. ISO 25010 standard describes the model 'quality in use' for evaluating the usability quality of software. In this research a tool based on ISO 25010 standard has been developed specifically to test 'Quality in Use' for websites of Punjabi and Hindi newspapers. The attributes that affect the usability quality are recognized and arranged in a questionnaire format in preparation for data collection. The data analysis can be conducted by using some statistical tool on the weighted dataset, where the rating for a question for each respondent can be multiplied by its perceived importance. The tool developed can be used to obtain feedback that can help understand, control, improve and make predictions about websites of newspapers in other languages also.*

Keywords— *Quality in Use, Newspaper domain, questionnaire, ISO 25010, usability quality, quality attributes, websites of Punjabi and Hindi newspapers.*

I. INTRODUCTION

Quality is difficult to define and measure. Hence, it is a very challenging job. One of the biggest signs that a website has quality problems is that users struggle to find the

information they are looking for or they simply cannot manipulate the contents as they wish. Some web pages are so cluttered that users can easily miss the link or the feature that they are looking for.

ISO 25010[1] standard describes the model for software product quality. The standard is divided into two-part quality model:

- Internal and external quality model
- Quality in-use model

One important difference between evaluating

external quality and evaluating quality in use is

that the former generally involves no real users but rather experts as long as the latter always involves real end users. So, for evaluating the external quality software testing tools are used. However, it is unthinkable to conduct a task testing in a real context of use without the end user participation. Moreover, satisfaction is the users' response to interaction with the product, and includes attitudes towards use of the product. Internal quality is considered for developers, external quality for managers whereas 'quality in use' is considered for users.

To measure 'Quality in Use' data can be collected by questionnaires, e-mails, online surveys and interviews. The choice between

modes is influenced by several factors including costs, coverage of the target population, flexibility of asking questions, respondents' willingness to participate and response accuracy. Questionnaires provides a relatively easy means to study the perceptions and opinions of a large group of people in a limited time frame and at low costs.

The ISO 25010 standard model for software 'quality in use' acts as a framework for this research. 'Quality in Use' is a measure of the quality of the system in a real or simulated operational environment. The attributes of quality (Figure 1.0) in use are categorized into three characteristics:

1. *Usability in use*: The degree to which specified users can achieve specified goals with effectiveness in use, efficiency in use and satisfaction in use in a specified context of use.
2. *Flexibility in use*: The degree to which the product is usable in all potential contexts of use.
3. *Safety*: Acceptable levels of risk of harm to people, business, data, software, property or the environment in the intended contexts of use.

So, based on this model a tool has been developed to measure 'quality in use' for websites of Punjabi and Hindi newspaper that can be implemented for other languages also.



Figure 1 Software Quality model for 'quality in use' (25010)

Following the introduction includes the related work. Section III introduces to the tool developed and pilot study and Section IV concludes the paper.

II. RELATED WORK

Arno et al. [2] in their research used 328 websites of hotels in the German-speaking Alpine region to test their web site adoption model. A questionnaire was developed to gather success measures and sent to each hotel which was completed by managers of 144 hotels.

Lotf et al.[3] in their paper presents an application of an information quality measuring methodology adapted and applied for the first time in the US banking industry. The information quality questionnaires were prepared and sent to 278 employees of the five branches of bank facilities that use to serve internal or external customers. Results of the study reveal that the proposed methodology can be used to identify quality differences between differing banking institutions and differing dimensions of information quality as well as a quality benchmarking procedure.

Mohammed et al. [4] study aims at evaluating the service quality of internet banking (i-banking) services in India from customer's perspective. The questionnaire containing 44 quality items was administered for various groups. Seven quality dimensions viz. reliability, accessibility, user-friendliness, privacy/security, efficiency, responsiveness and fulfillment are identified based on principal component factor analysis. Sanne et al. [5] presented a Website Evaluation Questionnaire (WEQ).

The method opted by JCPenny [6] was very efficient. In order to increase the person's desire to participate in the study, JCPenny presented a small gift to all respondents. The respondents were asked to visit the JCPenny website in their respective countries (jcpenny.com for the US and jcpennykorea.com for Korea). Respondents

were then asked to browse the site for 15–20 min, scrolling up and down the pages, clicking on links and using any features that interested them on the site. After reviewing the site, the participants were asked to fill out the questionnaire.

Alexander Nikov et al. [7] aimed at determining the effect of subjective measures of web service usability on its objective measures. The authors have done usability evaluation of web services in West Indies. A case study with university student information system including 179 students was carried out. Using these results by appropriate design of web system its usability can be improved. A checklist combining the dimensions of web service usability and web service quality has been proposed.

Adel M. Abdwani [8] developed an instrument that captures key characteristics of web site quality from the user's perspective. The 25-item instrument measures four dimensions of web quality: specific content, content quality, appearance and technical adequacy. The items are measured

using a seven-point scale ranging from (1) 'extremely not important' to (7) 'extremely important'. Adel subjected the instrument to a two stage data collection and refinement procedure. The first stage was used for design and the second stage for normalization. In first stage of data collection, the 55-item instrument was administered to student web users enrolled in 3 different sections of an introductory information systems class at a business school. One hundred four web users participated in the study. The instrument exhibits psychometric properties. The instrument can be useful to organizations and web designers as it provides an aggregate measure of web quality and to researchers in related web research.

The method opted by Stuart J. Barnes et al. [9] is very useful. They utilized the eQual approach to analyze user perceptions for the quality of UK Government national website (Inland Revenue—a site relating to UK tax

policy and administration). In eQual approach, web site users are asked to rate target sites against each of a range of qualities and to rate each of the qualities for importance. eQual has been under development since 1998 and has undergone numerous iterations. The standard eQual instrument, previously called Webqual contains 23 questions. The survey of web site quality was conducted by using an Internet-based questionnaire. Survey data collected via the eQual instrument was used to statistically model the perceptions of site users.

In eQual instrument there were 23 questions (covering various quality attributes like usability e.g. I find the site easy to navigate. I find the site easy to use. The site has an attractive appearance). Users were asked to rate the site for each quality using a scale ranging from 1 (strongly disagree) to 7 (strongly agree). Users were also asked to rate the importance of the quality again using a 1 (least important) to 7 (most important) scale. Open comments were encouraged and a remarkably high proportion of respondents took the effort to provide an additional comments on the site (65%). 420 usable responses (Interactive users 264 and non -interactive users 156). Open comments were imported into Nvivo (a tool for qualitative analysis) as documents with demographic data of the respondents as attributes. Nvivo was then used to code the data. The data analysis was conducted on the weighted dataset, where the rating for a question for each respondent was multiplied by its perceived importance. Comments from 273 was tested using ANOVA.

Divya Singhal et al. [10] explores the major factors responsible for internet banking based on respondents perception on various internet banking applications. The study employs primary data as well as secondary data. Secondary data was collected from different published sources while primary data was collected by structured survey. A structured questionnaire containing 32 items were developed (18 for general perception and 15 for internet banking features) for the purpose of data collection. All items were

measured by responses on a five point likert scale in relevance with statements ranging from 1-Strongly Disagree/Completely Irrelevant to 5-Strongly Agree/ Completely Relevant. The analysis of primary data was carried out using statistical package for the social sciences (SPSS 16.0 for Windows). Factor analysis results indicate that 'utility request', 'security', 'utility transaction', 'ticket booking' and 'fund transfer' are major factors. Out of total respondents, more than 50% agreed that internet banking is convenient and flexible ways of banking and it also have various transaction related benefits.

III. A TOOL DEVELOPED FOR MEASURING 'QUALITY IN USE' FOR WEBSITES OF PUNJABI AND HINDI NEWSPAPERDOMAIN

As Adel. M. Adwani et al. [8] mentioned that following Churchill's recommendation the developed tool should be subjected to a two-stage data collection and refinement procedure. Similarly, in this research also the first stage is used for design and the second stage for normalization. A pilot study is carried out beforehand to validate the questionnaire and to make sure subjects would use no more than 15-20 minutes to assess the website(s) and fill-out the questionnaires.

A. Pilot Study

The pilot study was performed on the three websites of Newspaper domain i.e. Ajit(from Jalndhar) and Media (from Germany) of Punjabi Language and Dainik Bhaskar(India) of Hindi Language.

Fifty five item (Attributes) instrument was administered by four users who are faculty in Sri Guru Gobind Singh College, Chandigarh and are frequent web users, well qualified and well experienced. Six participants were from Punjabi University who

are computer professionals and are working for the advancement of Punjabi language only. Most of them were doctorates or are pursuing PhD therefore they perform the tasks and filled questionnaires sincerely and made valuable suggestions about phrasing, formatting and classification of the web objects. This led to about twenty web objects being dropped.

Another purpose of the pilot test was to find out how much time each subject needed to finish a series of tasks. Earlier, there were three websites so as to compare their quality. Now, instead of testing three websites and then rating for the quality attributes for each website which was time consuming as well as confusing also now only one website have to be tested. Different websites will be tested by different evaluator so, the evaluators will be increased three times if we want to test and compare three websites.

Thus, based on pilot test results, it was determined that 5-6 simple tasks for one website could be accommodated within the 15-20 minute target for the experiment.

B. Developed Tool

In this research a tool based on ISO 25010 standard has been developed (Appendix) to test "Quality in Use" for websites of newspaper domain. The attributes that affect the usability quality are recognized and arranged in a questionnaire format in preparation for data collection. A closed ended questionnaire has been designed as the quality of websites has to be measured quantitatively. In a closed questionnaire the subcategories items and scales are considered. The questionnaire's items are designed to represent quality attributes, and then specifying them in a satisfaction requirement tree. Each questionnaire's item is quantified by a metric (regarding the user questionnaire scale), and in turn elementary indicators are derived accordingly. The users are asked to browse the Hindi/Punjabi version of these websites to perform some tasks before filling the questionnaire. As, the functionality varies for different domains of websites. The set of questionnaires can be prepared with some variations for different domains.

In this research a questionnaire has been prepared for Newspaper domain. The questionnaire includes three sections. The first section consists of questions about the respondents' demographic characteristics (i.e. age, education qualification, gender, etc.) Additionally, they were asked how many years they had been using the Internet, how many times they had used the websites other than English language etc.

Second section consists of performing six tasks that are different for different domains. The evaluators are asked to browse any one Hindi/Punjabi version of website from the three mentioned websites to perform these tasks.

Third Section consists of questions assessing the respondents' satisfaction with the site and their views about the degree of importance of each quality attribute. They are asked to rate each quality attribute according to the level of satisfaction for the websites. All the 31 questions are to be answered on a five-point Likert scale Users are asked to rate the site for each quality using a scale ranging from 1(Strongly Disagree) to 5(Strongly Agree). Additionally, they have to rate the quality attributes according to their importance, again using a 1(least important) to 5(Most Important) scale. Further, open comments are also invited.

The data analysis will be conducted by using some statistical tool on the weighted dataset, where the rating for a question for each respondent will be multiplied by its perceived importance as is done by Stuart J Barnes [9].

The tool developed can be useful to organizations and web designers as it provides an aggregate measure of web quality and to researchers in related web research.

IV. FUTURE WORK AND CONCLUSION

The tool developed for measuring 'quality in use' can be used to evaluate development of existing web sites and hence feedback can be

obtained that can help understand, control, improve and make predictions about the websites and

also undertake the development processes and to feed design guidelines. And subsequently, can be embedded in web authoring tools thus, improving the overall quality of web sites of Newspaper domain.

The tool (questionnaire's) developed for measuring 'quality in use' can be used to evaluate the quality and development of existing web sites, feedback can be obtained that can help understand, control, improve and make predictions about the websites and their development processes and to feed design guidelines and can be embedded in web authoring tools. Thus, improving the quality of web sites of Newspaper domain.

Thus, the web quality model and the tool developed to measure 'quality in use' can be useful to organizations and web designers as it provides an aggregate measure of web quality (external quality as well as quality in use) and to researchers in related web research.

REFERENCES

- [1] ISO/IEC CD 25010 Software engineering -- Software product Quality Requirements and Evaluation (SQuaRE) -- Quality model and guide.(2009).
- [2] Arno Scharl ,Karl W.Wober and Christian Bauer.2004.*An Integrated Approach to Measure web Site Effectiveness in the European Hotel Industry*.Information Technology and Tourism, Vol.6 pp.257-271,2004.
- [3]
- [4] Lotfallah Najjar and Marc J .Schniederjans.2006.*A Quality Information Benchmarking Methodology:A US Banking Industry Empirical Study*.Quality and Quantity.Springer.
- [4] Mohammed Sadique Khan, Siba Sankar Mahapatra, N. A. Sreekumar, *Service quality*



- evaluation in internet banking: an empirical study in India.* International Journal of Indian Culture and Business Management ,2(1). DOI:10.1504 /IJICB M.2009.
- [5] Sanne Elling, Leo Lentz and Menno de Jong. Website Evaluation Questionnaire: Development of a Research based Tool for Evaluating Informational Websites. Book, LNCS Springer, ISSN 0302-9743, 2007
- [6] jpenney
- [7] Alexander Nikov ,Selim Zaim ,Asil Oztekin , “Usability Evaluation of Web services by Structural Equation Modeling” SEM WebServUse -CMAIA 2006.
- [8] Adel Aladwani, Adel .M. and Palvia, P.C, *Developing and validating an instrument for measuring user-perceived web quality.* J. Information and Management. Elsevier. Volume 39, Issue 6, May 2002, Pages 467–476 (2002).
- [9] Stuart J. Barnes, Richard T. Vidgen, *Data Triangulation in Action: Using Comment Analysis to Refine Web Quality Metrics.* 92-103, ECIS 2005.
- [10] Divya Singhal, V.Padmanabhan, *A Study on Customer Perception major contributin factors.* The Journal of Nepalese Business studies Vol No.1, pp101-110. Dec. 2008.
- [11] <http://usabilitygeek.com/an-introduction-to-website-usability-testing>. (Assessed on 14 May, 2013).
- [12] http://en.wikipedia.org/wiki/Usability_testing (Assessed on 14 May, 2013).
- [13] A.K. Abd EI-Aleem ,W.F. EI-wahed , N.A. Ismail , F.A. Torkey, *Efficiency Evaluation of E-Commerce Websites.* World Academy of Science, Engineering and Technology 2005.
- [14] Khan M.S. , Mahapatra S.S. , Sreekumar, *Service quality evaluation in internet banking : an empirical study in India.* Int J. Indian Culture and Business Management , Vol.2.No.1, pp.30-46, 2009.
- [15] Francisco Javier Miranda ,Rosa Cortes and Cristina Barriuso, *Quantitative Evaluation of e-banking web Sites : an Empirical Study of Spanish Banks,* The Electronic Journal information Systems Evaluation Volume 9 , issue 2, pp73-82, 2006
- [16] <http://www.springer.com/978-3-642-01174-7>

