SOFTWARE METRICS

PRODUCT NAME: Abe books

http://www.abebooks.co.uk

Usability measurement proposal from user’s point of view

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# ***Abstract***

***As I work in a CMM level 4 web Company my Project Manager has given the task to measure the usability of the website*** [***http://www.abebooks.co.uk/***](http://www.abebooks.co.uk/) ***from Users Point of View. We have utilized the two articles, which are given to know the different types of metrics that are available. The Assignment is composed of the Describing the Goal, Questions and the corresponding Metrics. GQM tree , Empirical Studies is also presented in the assignment. The Conclusion is the importance of the Usability Measurement of a website through this assignment is understood and presented well by assigning metrics to the attributes and entities.***

**I. Introduction**

A web application is a collection of one or more web pages relate to a common theme, such as person, business or organization. Recent trends in web usability, usage of website became very common to do daily tasks in life. Now a day’s ecommerce website with better usability practices can increase the clarity, simplicity and design consistency of a web page, so that the user can perform task efficiently and effectively. Usability is one of the major factors that determines the success of a website. In the following sections the authors try to measure the usability of the given web site by calculating various metrics associated with it.

**Details of the website:**

Abe books is having a former name as advanced book exchange, it is a venue for the customers who wants to purchase books through online. The books in this web site are listed in three categories they are used, rare and out of print. This company has launched its websites in 1996 Abe books offers six region websites North America, French, Germany, Italy, UK and Spain. The website users can search the books, they will be provided with listings of many independent book stores. There are two facilities available in this website, one can buy books through online and while others also maintain a regular store front.

User is provided with advanced search, browser, rare books and textbooks. As soon as the user open the application he will have a menu bar with options, author, title, keyboard, ISBN of the book user is searching for more over user is provided with individual user account with an option of “MY ACCOUNT”, so that user can keep track of purchases and get the updates of new books available on the web site. The payment for the selected books can be done using a well-defined catalogue option.

**Overview**

Following is a brief description and reminder of this document:

**Section 1:** it provides the context, purpose and overall description of document.

**Section 2:** this section provides the measurement goal for which the product would be examined

**Section 3:** this section specifies methodology, questions and metrics to be considered for achieving goals identified in section 2

**Section 4**: it presents entities, attribute types, metrics and scale type.

**Section 5:** in this section, questionnaires is presented followed by suggested empirical study method

## II. Measurement goals

#### Purpose:

Measuring the usability of the given website.

#### Perspective:

#### To examine the simplicity, Navigation, Reliability, Usefulness, Supportability, Screen appearance, Accessibility and compatibility from user’s perspective.

**Environment and constraints:**

While analyzing the web site (from 2015-09-01 to 2015-10-09) there were no changes in the website.

Analyzing the website is permitted to UK domain name (<http://abebooks.co.uk>).

The analysis done in this study is based on the articles [2][3][4].

The global visitors of the website can be adults, students, book lovers, poets, technocrats and etc.

## III. Goal-Question-Metric (GQM)

### **Table 1. GQM Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Serial** | **Goal** | **Questions** | **Metrics** |
| **G1** | **simplicity** | Is it easy for the users to search and operate? | Appropriateness of search results |
| Does all the pages in the web site are available to the user? | Satisfaction with unlimited access to the pages for the required books. |
| **G2** | **Navigation** | Does the search navigates to the desired result? | Gratified with the desired search result. |
| Are there any broken links in the website? | structure |
| What is the level of difficulty to navigate between the links and the home page? | Ease of use of webpage |
| Is the user able to know the current location in the website? | Breadcrumb navigation |
| **G3** | **Reliability** | Is auto correction present in the website? | Error handling |
| Are the details specified in the web page trust worthy? | correctness |
| **G4** | **Usefulness** | Is the web site really useful in searching the required book? | Satisfied with the usability of search options to get required book. |
| Does the user get adjusted with the changes made to the web site design? | Level of acceptance to get adjusted. |
| Is the web site usable for different type of users? | Available to different types of users. |
| **G5** | **Supportability** | Does the web page provides various contact methods? | Availability of email contact method. |
| Does FAQ’s provide necessary solution to the user? | FAQ’s support. |
| **G6** | **Screen appearance** | How is the page layout presented in the webpage? | Layout |
| What is the level of graphics used for the webpage? | Level of graphics. |
| Is the scrolling involved in the website being effected with the resolution? | Page alignment |
| **G7** | **Accessibility** | How much time does it take to search? | Time. |
| What is the response time of the webpage? | Time. |
| Is alternative description provided for the content on the webpage? | Alt text. |
| Does the web site works at any instant of time? | Status of website |
| **G8** | **compatibility** | Does the web site works on various electronic devices like iPad, phones and tablets? | Device support. |
| Does the web site works on different web browsers? | Browser compatibility. |

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| **goals** |
| Simplicity |
| Navigation |
| Reliability |
| usefulness |
| Supportability |
| Screen appearance |
| accessibility |
| compatibility |

**FIGURE 1. GQM TREE**

|  |
| --- |
| **questions** |
| Is it easy for the users to search and operate? |
| Does all the pages in the web site are available to the user? |
| Does the search navigates to the desired result? |
| Are there any broken links in the website? |
| What is the level of difficulty to navigate between the links and the home page? |
| Is the user able to know the current location in the website? |
| Is auto correction present in the website? |
| Are the details specified in the web page trust worthy? |
| Is the web site really useful in searching the required book? |
| Does the user get adjusted with the changes made to the website design? |
| Is the web site usable for different type of users? |
| Does the web page provides various contact methods? |
| Does FAQ’s provide necessary solution to the user? |
| How is the page layout presented in the web page? |
| What is the level of graphics used for the web page? |
| Is the scrolling involved in the website being effected with the resolution? |
| How much time does it take to search? |
| What is the response time of the webpage? |
| Is alternative description provided for the content on the webpage? |
| Does the web site works at any instant of time? |
| Does the web site works on the various electronic devices like ipad, phones and tablets? |
| Does the web site works on different web browsers? |

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| **metrics** |
| Appropriateness of search results |
| Satisfaction worth unlimited access to the page for the required books. |
| Gratified with the desired search result. |
| Structure |
| Ease of use of webpage |
| Breadcrumb navigation |
| Error handing |
| Correctness |
| Satisfied with the usability of search options to get required book. |
| Level of acceptance to get adjusted. |
| Available to different types of users. |
| Availability of email contact method. |
| FAQ’s support. |
| Layout |
| Level of graphics |
| Page alignment |
| Time |
| Time |
| Alt text |
| Status of website |
| Device support |
| Browser compatibility |

**Table 2. Scale Types and the corresponding attributes for the Question’s Formulated are as follows:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| serial | | goals | questions | entities | Attributes | metrics | Scale type | Scale point |
| G1 | | simplicity | Is it easy for the users to search and operate? | Webpage | Internal | Appropriateness of search results | Ordinal | Likert scale ranging from 1 to 5. |
| Does all the pages in the web site are available to the user? | Website | Internal | Satisfaction with unlimited access to the pages for the required books. | Nominal | Yes or No |
| G2 | | navigation | Does the search navigates to the desired result? | Webpage | External | Gratified with the desired search result. | Nominal | Yes or No |
| Are there any broken links in the website? | Webpage | External | Structure | Nominal | Yes or No |
| What is the level of difficulty to navigate between the links and the home page? | Webpage | External | Ease of use of webpage | Ratio | -Milliseconds |
| Is the user able to know the current location in the website? | Webpage | External | Breadcrumb navigation | Nominal | Yes Or No |
| G3 | | reliability | Is auto correction present in the website? | Website | Internal | Error Handling | Nominal | Yes or No |
|  |  | | Are the details specified in the web page trust worthy? | Webpage | Internal | Correctness | Nominal | Yes or No |
| G4 | usefulness | | Is the web site really useful in searching the required book? | Webpage | Internal | Satisfied with the usability of search options to get required book. | Nominal | Yes or No |
| Does the user get adjusted with the changes made to the web site design? | Webpage | External | Level of acceptance to get adjusted. | Ordinal | Likert scale ranging from 1 to 5. |
|  |  | | Is the web site usable for different type of users? | Webpage | External | Available to different types of users. | Nominal | Yes or No |
| G5 | supportability | | Does the web page provides various contact methods? | Webpage | External | Availability of email contact method. | Nominal | Yes or No |
| Does FAQ’s provide necessary solution to the user? | webpage | External | FAQ’s Support | Nominal | Yes or No |
| G6 | Screen appearance | | How is the page layout presented in the webpage? | Webpage | External | Layout | Ordinal | Likert scale ranging from 1 to 5. |
| What is the level of graphics used for the webpage? | Website | External | Level of Graphics | Ordinal | Likert scale ranging from 1 to 5. |
| Is the scrolling involved in the website being effected with the resolution? | Webpage | External | Page alignment | Nominal | Yes OR No |
| G7 | Accessibility | | How much time does it take to search? | Webpage | External | Time | Ratio | - Milliseconds |
| What is the response time of the webpage? | Webpage | External | Time | Ratio | -Milliseconds. |
| Is alternative description provided for the content on the webpage? | Webpage | External | Alternative text | Nominal | Yes or No |
| Does the web site works at any instant of time? | Webpage | External | Status of the website | Nominal | Yes or No |
| G8 | compatibility | | Does the web site works on various electronic devices like iPad, phones and tablets? | Webpage | External | Device Support | Nominal | Yes or No |
| Does the web site works on different web browsers? | Webpage | External | Browser Compatability | Nominal | Yes or No |

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#### IV. QUESTIONAIRE

To measure the usability of the website questionnaire is formulated. In order to design the questionnaire in a generalized way the set of standards or guidelines are taken from http://www.abebooks.co.uk. In our survey questionnaire, which we intend to use the same once that is used for the questionnaire. The survey is posted in the book website itself. This reduces the scope of the total number of respondents to those who only visit the website. The questions are presented below and the corresponding need for particular question.

1. Is it easy to search and operate within the website, using Likert Scale what is the rating from 1 to 5 you will give?
2. 1
3. 2
4. 3
5. 4
6. 5
7. Does all the pages in the web site are available to Use?
8. Yes
9. No
10. Does the search navigates to the desired result?
11. Yes
12. No
13. Are there any broken links in the website?
14. Yes
15. No
16. What is the level of difficulty to navigate between the links and the home page?
17. Nanoseconds’
18. Microseconds
19. Milliseconds
20. Are you able to know the current location in the website?
21. Yes
22. No
23. Is auto correction present in the website?
24. Yes
25. No
26. Are the details specified in the web page trust worthy?
27. Yes
28. No
29. Is the web site really useful in searching the required book?
30. Yes
31. No
32. Are you able to get used with respect to the changes made to the web site design, from Likert Scale 1 to 5 give your rating?
33. 1
34. 2
35. 3
36. 4
37. 5
38. Is the web site usable for different type of users?
39. Yes
40. No
41. Does the web page provides various contact methods?
42. Yes
43. No
44. Does FAQ’s provide necessary solution to the user?
45. Yes
46. No
47. How is the page layout presented in the webpage, Using Likert Scale give your rating between 1 to 5 scale?
48. 1
49. 2
50. 3
51. 4
52. 5
53. What is the level of graphics used for the webpage, using Likert Scale give your rating between 1 to 5 scales?
54. 1
55. 2
56. 3
57. 4
58. 5
59. Is the scrolling involved in the website being effected with the resolution?
60. Yes
61. No
62. How much time does it take to search?
63. Nanoseconds’
64. Micro Seconds
65. Milliseconds’.
66. What is the response time of the webpage?
67. Nanoseconds’
68. Micro Seconds
69. Milliseconds’.
70. Is alternative description provided for the content on the webpage?
71. Yes
72. No
73. Does the web site works at any instant of time?
74. Yes
75. No
76. Does the web site works on various electronic devices like iPad, phones and tablets?
77. Yes
78. No
79. Does the web site works on different web browsers?
80. Yes
81. No

## V. Proposed Empirical Study

The purpose of empirical study for a product is very important. The usability of the product can be improved by the empirical study. In this paper we propose an empirical research method that is carried out in a small web company. The maturity level of the web company also helped us tremendously in our work. To carry out the empirical method procedure without any deviation from the quality standard of the web company.

### EMPIRICAL METHOD

In this section we will explain the empirical research method that is used. We also explain the purpose or cause of choosing the particular empirical method.

1. OBJECTIVES

Our main objective is carrying out the usability measurement of the online book store website company namely http://www.abebooks.co.uk.The main focus is on the usability of the website. The web company is CMM level 3 organization, so we have obtained a set off defined metrics that can be used in our plan of execution in order to measure the usability of the website. The usability measurement of the website in this project is based on the user’s perspective. In order to know the users perspective on the revisions that are made on the website with respect to design and to know the intensions of the user we need to use certain empirical method. There are various techniques to perform the study. The survey is used as the empirical method to reach our objective that is to empirically evaluate the usability of the website.

1. DATA COLLECTION

In order to collect data we use the online survey questionnaire. For the survey that we conduct it involves gathering two types of data collection methods. One of the data collection involves posting the online survey questionnaire link on the website that is under inspection and inform the users about the survey, the opinions that are given by the users are collected later as part of data collection. The website is useful in posting the questionnaire link as it helps in reducing the number of users sampling space to only those who use the website to retrieve the books. The second data collection method involve giving the questionnaire to the users who are accustomed to the website and who use more frequently which help in practically observe the responses and also the results obtained will be concrete results as they know what the book store website is lagging. Their answers can be much reliable once.

1. SUBJECTS FOR SAMPLE

The sampling of the population should be so appropriate that the selected sample space should represent and reflect the whole population. There are three kinds of classification of the users who use the book store website [1][3]. Children, adults and parents are the three classes that visit the website. Therefore as there are three classes that are present so we need to considered while analysis of data into three categories that is feedback from the children, Feedback from the adults and the feedback from the parents? But these data that is categorized doesn’t affect the maintenance usability of the website as all the data together is combined in order to analyze. Therefore the only difference is that the responses are gathered using the data collection method using the different categories. But the results are combined in order to understand the usability measurement of the website.

1. RESEARCH METHOD

The online survey questionnaire is the research empirical method used in order to understand the usability measurement of the website. As the responses of the user are very much required we use the online survey. The survey and experiment generalize the sample to a large population and also both require a random sample here for the survey we use the sample as the users who visit the website to check the books. But Our research involve the opinion of the population or user so with respect to survey and experiment the survey is better choice as in the formal experiment’s the sample will determine the population not the population determining the sample.

Although formal experiment can also be used in this research as one variable can be using the current design of the website and the other variable is the website after the changes made according to the user and both the development results are analyzed to understand the better once. But we observed the survey is the better option and it helps to concentrate on the large population sample.

Other alternatives for the empirical method selection involve the case study and postmortem. The case study is not considered as it does not provide the controlled environment .The opinions of the user is must in order to understand the design flaws in the website. The work involves identifying the impact of the usability measurement of the website on the changes made to the design of the website. Thus the nature of study for empirical method is retrospective approach which should be followed. These two above stated requirements are in contrast to the case study empirical method.

Similarly the postmortem analysis is considered after the development of the project. This postmortem analysis help to understand and learn the issues in the product after development. There is no availability of the users who have been using the website for long time so it is hard to get reliable and concrete results. Thus it makes the choice of postmortem analysis impossible to generalize the results to large population.

More over the results can only be generalized in both the case study and survey to only to similar metrics and similar projects within the organization.

Thus we choose the survey as it helps in getting the data and to cumulate them to large extent of population sample size. The formal experiment is not chosen as it involve the control over the variables that are under the investigation. The current variable is the design revisions that cannot be influenced under the controlled environment but to revise based on the user revelations about the need for changes in the design of the website so thus the experiment is also neglected. Which gives us the only option the survey.

e) APPROACH

The steps followed while developing gathering the data.

1. The questionnaire is posed in the website that is under the investigation. The notification is given to the users about the coupons and the discounts that are there on purchase of the books.
2. The same questionnaire is traversed among more common users to get the results on the design aspects of the website and these users help in reflecting the general user group or large population and identify the important aspects of usability measurement by observation.
3. The obsolete entities and incomplete data are discarded when the data is collected[1].
4. To find the gap in the design the data collected is imbibed with the selected metrics and scales and then transforming the data to measurable once.
5. Finally map the data with the usability measurement activities and then provide the rules and protocols to the web designers to improve the website.

### **VI. SUMMARY**

This section deals with the summary of the complete usability measurement of the online bookstore <http://www.abebooks.co.uk>. This include the measurement goal while measuring the usability of the website. The usability measurement is based on the Goal – Question- Metric (GQM) framework.

The questions were formulated and the corresponding metrics that are necessary to the question are stated. Then later the metrics are mapped to the attributes and entities. Furthermore the scale and measurement type are noticed. The questionnaire that is related to the usability of the website is written to understand then proposed the online web survey based on questionnaire that is prepared as the empirical method to state the goal.

#### REFERENCES

1. N. E. Fenton, Software metrics: a rigorous approach. London, UK: Chapman and Hall, 1991.
2. P. van Schaik and J. Ling, “Five Psychometric Scales for Online Measurement of the Quality of Human-Computer Interaction in Web Sites,” International Journal of Human-Computer Interaction, vol. 18, no. 3, pp. 309–322, 2005.
3. M. G. MORRIS and J. M. TURNER, “Assessing users’ subjective quality of experience with the world wide web: an exploratory examination of temporal changes in technology acceptance,” International Journal of Human-Computer Studies, vol. 54, no. 6, pp. 877– 901, Jun. 2001.
4. C. Flavian, R. Gurrea, and C. Orús, “Web design: a key factor for the website success,” Journal of Systems and Information Technology, vol. 11, no. 2, pp. 168–184, May 2009.