

**TABLE OF CONTENTS**

**CHANGE LOG** ...................................................................................................... 3

1. **INTRODUCTION** ............................................................................................ 4

1.1 PURPOSE ...................................................................................................... 4 1.2 PRODUCT ..................................................................................................... 4 1.3 OVERVIEW .................................................................................................... 4

1. **MEASUREMENT GOAL** ................................................................................ 5
2. **GOAL QUESTION METRIC (GQM)................................................................ 5**

##### 3.1 GQM TABLE ................................................................................................. 5 3.2 GQM TREE ................................................................................................... 8

1. **ENTITIES, ATTRIBUTES AND MATRICS ...................................................... 9**

1. **QUESTIONAIRE ............................................................................................ 16**
2. **PROPOSED EMPIRICAL STUDY ................................................................ 19**

6.1.TO-DO TASKS FOR FORMAL EXPERIMENTS...................................................... 19

##### 6.2. TARGETED AUDIENCE QUESTIONNAIRE ......................................................... 20

**7 REFERENCES ................................................................................................... 24**

Revision History

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Version** | **Date of Change** | **Changed By** | **Summary of Change** | **Page Changed** |
| 0.1 | 2014-05-05 | Usman, Santosh and Uday | Initial Draft | ALL |
| 1.0 | 2014-05-12 | Usman, Santosh and Uday | Identified and documented entities, attributes and metrics | 8 and above |
| 1.1 | 2014-05-19 | Usman, Santosh and Uday |  | 4 and Above 16 |
|  |  |  |  |  |

### 1. Introduction

Over the past few years, a tremendous growth in number of websites is getting noticed. In the current era of information technology, any organization or business requires web existence. Besides this esteemed expansion there are number of quality factors that are considered for the success of any web. However, various research studies [1][2] have revealed that usability is the major quality factor that can be the dominant factor for success or failure of websites. Websites with poor usability are replaced by the websites with good usability [2].

#### 1.1. Purpose

Currently holding Capability Maturity Model (CMM) level 4, SmarTech always focused to deliver web with best user experiences. To achieve this focus, the company put maximum efforts to ensure that the developed products are easy to use. The document under study is an effort to help in achieving this goal. This states the proposal for measuring usability from user's viewpoint for a latest developed web named as PBSKIDS.

#### 1.2. Product

PBSKIDS is a web application that is principally designed for kids in order to enrich them with knowledge, technology, critical thinking and curiosity [3]. PBSKIDS also facilitate parents, teachers, guardians and communities to participate in order to accomplish this goal. Therefore, the intended audience includes kids (primary), parents, caregivers and teachersThe contents of web are proclaimed to be aligned with school curricula so to make kids successful in school and early life [3].

#### 1.3. Overview

Following is a brief description and reminders 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, attributes, attribute types, metrics and scale type.

Section 5: In this section, questionnaire is presented followed by suggested empirical study method.

### 2. Measurement Goal

Following table describes the measurement goal for this product:

|  |  |  |
| --- | --- | --- |
| **Purpose** | **Perspective** | **Environment and Constraints** |
| Evaluate PBSKIDS (product) in order to identify usability issues | Examine the usability from the viewpoint of users (User's perspective).  • Identify usability factor issues related to simplicity, navigation, attractiveness, reliability, usefulness, supportability, efficiency, completeness, safety and  compatibility | * Users are kids (primary), parents, teachers and caregivers. * Global users * Developed web based   application (PBSKIDS) |

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

GQM is the most acceptable method of measuring quality of projects and provides a top-down fashion in order to characterize and determine the measurement goals [4,7].

#### 3.1. GQM Table

GQM table is produced explaining goals, relevant questions and metrics required for measurement in order to achieve the specified goals. The primary goal is divided into sub-goals and include simplicity, adoptability, supportability, safety, reliability, efficiency, correctness, completeness, compatibility and attractiveness. These sub goals are identified by exploring the product and with the help of research studies conducted on usability for web[3,4,5,6]:

|  |  |  |  |
| --- | --- | --- | --- |
| **Serial** | **Goal** | **questions** | **metrics** |
| **G1** | **simplicity** | Is it easy for the users to search and operate? | Satisfaction when operating through webpages for required books. |
| Does all the pages in the web site are available to the user? | Satisfaction with unlimited acess to the pages for the required books. |
| Does the close captions provide the necessary output? | Satisfaction with close caption as output method. |
| Does the user believe in fear of missing something in the web site? | Satisfaction with the availability of information that is required. |
| How effective is the web site in loading the pages? | Satisfaction with loading time. |
| **G2** | **Navigation** | Does the search navigates to the desired result? | Gratified with the desired search result. |
| Does the links work efficiently? | Gratified with the navigation. |
| Is it difficult to navigate between the links and the home page? | Easiness to navigate from current page to home page. |
| Does the link states where it is navigated to? | Relief with the navigated output of the link. |
| Is the user given a variety of navigation options? | Availability of number of link options. |
| **G3** | **Reliability** | Is there any presence of errors? | Less number of errors. |
| Is the specified book in the web site is correct? | Incorrect author spelling but relevant books. |
| Does the content in the link match to the specified book? | Satisfied with the reliable content accessed with the link. |
| **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. |
| Is the user satisfied with the contact methods? | Satisfied with the provided contact method. |
| Does FAQ’s provide necessary solution to the user? | FAQ’s support in resolving the queries. |
| How long user needs to wait for reply in case of contact? | Time taken for the reply. |
| **G6** | **Attractiveness** | Is the web page attractive to the users? | Satisfied with the appearance of the web site. |
| What is the experience of the user on using the web site? | Level of enjoyment. |
| Is the color used in the web site are attractive? | Satisfied with the colors used. |
| **G7** | **Efficiency** | How much time does it take to search? | Lesser search time. |
| How much time does it take to load a book? | Lesser loading time. |
| How much time does it take to navigate between the links? | Number of broken links are less. |
| Does the web site works at any instant of time? | Satisfied with the performance. |
| **G8** | **completeness** | How often does the web page get revised? | Satisfied with the revision. |
| How effectively is the user satisfied with the web site? | Level of completeness. |
| Is the close caption available in the search string? | Inconsistence in providing close caption. |
| **G9** | **Safety** | Does the web site has the safest payment procedure? | Feeling secured with the payment procedure. |
| Is the web site secure to use? | Safety while using web site. |
| Is the user information secured? | Secured user information. |
| **G10** | **compatibility** | Does the web site works on various electronic devices like ipad, phones and tablets? | Satisfied with different devices. |
| Does the web site works on different web browsers? | satisfied |

#### 3.2. GQM Tree

|  |
| --- |
| **goals** |
| Simplicity |
| Navigation |
| Reliability |
| usefulness |
| Supportability |
| Attractiveness |
| Efficiency |
| Completeness |
| Safety |
| compatibility |

|  |
| --- |
| **metrics** |
| Satisfaction when operating through webpages for required books. |
| Satisfaction with unlimited acess to the pages for the required books. |
| Satisfaction with unlimited acess to the pages for the required books. |
| Satisfaction with the availability of information that is required. |
| Satisfaction with loading time. |
| Gratified with the desired search result. |
| Gratified with the navigation. |
| Easiness to navigate from current page to home page. |
| Relief with the navigated output of the link. |
| Availability of number of link options. |
| Less number of errors. |
| Incorrect author spelling but relevant books. |
| Satisfied with the reliable content accessed with the link. |
| 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. |
| Satisfied with the provided contact method. |
| FAQ’s support in resolving the queries. |
| Satisfied with the appearance of the web site. |
| Level of enjoyment. |
| Satisfied with the colors used. |
| Lesser search time. |
| Lesser loading time. |
| Number of broken links are less. |
| Satisfied with the performance. |
| Satisfied with the revision. |
| Level of completeness. |
| Inconsistence in providing close caption. |
| Feeling secured with the payment procedure. |
| Safety while using web site. |
| Secured user information. |
| Satisfied with different devices. |

|  |
| --- |
| **questions** |
| *I*s it easy for the users to search and operate? |
| Does all the pages in the web site are available to the user? |
| Does the close captions provide the necessary output? |
| Does the user believe in fear of missing something in the web site? |
| How effective is the web site in loading the pages? |
| Does the search navigates to the desired result? |
| Does the link works efficiently? |
| Is it difficult to navigate between links and home page? |
| Does the link states where it is navigated to? |
| Is the user given a variety of navigation options? |
| Is there any presence of errors? |
| Is the specified book in the web site is correct? |
| Does the content in the link match to specified book? |
| Is the web site really useful in searching required book? |
| Does the user accepts the changes made to the web site? |
| Is the web site useful for all types of users? |
| Does the web page provides the contact address? |
| Is the user satisfied with the contact methods? |
| Does FAQ’s provide necessary solution to the user? |
| Is the web page attractive to the user? |
| What is the experience of the user on using the web site? |
| Are the colors used in the web site are attractive? |
| How much tome does it take to search? |
| How much time does it take to load a book? |
| How much time does it take to navigate between links? |
| Does the web site works at given any instant of time? |
| How often the web page gets revised? |
| How effectively Is the user satisfied with the web site? |
| Is the close caption available in the search strings? |
| Does the web site has safest payment procedures? |
| Is the web site secure to use? |
| Is the user information secured? |
| Does the web site works on various electronic devices like ipad, mobiles, tablets |
| Does the web site works on different web browsers? |

Assignment 2- Part II

Software Metrics (PA 1407)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| serial | goals | questions | entities | attributes | | | metrics | Scale type | Scale point |
| internal | external | |
| G1 | simplicity | Is it easy for the users to operate? | Input (process) |  | Easiness | | Satisfaction when operating through webpages for required books. | Ordinal | Very Easy,  Easy,  Neutral, Hard, Very hard. |
| Does all the pages in the web page are helpful and available to the user? | Input (process) |  | Helpfulness | | Satisfaction with unlimited acess to the pages for the required books. |  | Very Helpful,  Helpful,  Neutral, Not Helpful. |
| Does the close captions provide the necessary output? | Input (process) |  | Easiness | | Satisfaction with close caption as output method. | Ordinal | Very Easy,  Easy,  Neutral, Hard, Very hard. |
| Does the user believe in fear of missing something in the web site? | Output (process) |  | Usefulness | | Satisfaction with the availability of information that is required. |  |  |
| How effective is the web site in loading the pages? |  |  |  | | Satisfaction with loading time. |  |  |
| G2 | navigation | Does the search navigates to the desired result? |  |  |  | | Gratified with the desired search result. |  |  |
| Does the links work efficiently? |  |  |  | | Gratified with the navigation. |  |  |
| Is it difficult to navigate between the links and the home page? |  |  |  | |  |  |  |
| Does the link states where it is navigated to? |  |  |  | |  |  |  |
| G3 | reliability | Is there any presence of errors? |  |  |  | |  |  |  |
| Is the specified book in the web site is correct? |  |  | |  |  |  |  |
| Does the content in the link match to the specified book? |  |  | |  |  |  |  |
| G4 | usefulness | Is the web site really useful in searching the required book? |  |  | |  |  |  |  |
| Does the user accepts the changes made to the web site? |  |  | |  |  |  |  |
| Is the web site usable for all types of users? |  |  | |  |  |  |  |
| G5 | supportability | Does the web page provides the contact address? |  |  | |  |  |  |  |
| Is the user satisfied with the contact methods? |  |  | |  |  |  |  |
| Does FAQ’s provide necessary solution to the user? |  |  | |  |  |  |  |
| G6 | attractiveness | Is the web page attractive to the users? |  |  | |  |  |  |  |
| What is the experience of the user on using the web site? |  |  | |  |  |  |  |
| Is the color used in the web site are attractive? |  |  | |  |  |  |  |
| G7 | efficiency | How much time does it take to load a book? |  |  | |  |  |  |  |
| How much time does it take to navigate between the links? |  |  | |  |  |  |  |
| Does the web site works at any instant of time? |  |  | |  |  |  |  |
| How much time does it take to search? |  |  | |  |  |  |  |
| G8 | completeness | How often does the web page get revised? |  |  | |  |  |  |  |
| How effectively is the user satisfied with the web site? |  |  | |  |  |  |  |
| Is the close caption available in the search string? |  |  | |  |  |  |  |
| G9 | safety | Does the web site has the safest payment procedure? |  |  | |  |  |  |  |
| Is the web site secure to use? |  |  | |  |  |  |  |
| Is the user information secured? |  |  | |  |  |  |  |
| G10 | compatibility | Does the web site works on various electronic devices like ipad, phones and tablets? |  |  | |  |  |  |  |
| Does the web site works on different web browsers? |  |  | |  |  |  |  |

Assignment 2- Part III

Software Metrics (PA 1407)

|  |  |  |
| --- | --- | --- |
|  |  |  |

1. **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 …. In order to understand which age group are visiting the book store the age is dependent as the store consists of all variety of books for different group of age. In our survey questionnaire, which we intend to use the same once that is used for the questionnaire. In our survey questionnaire, initially we asked questions like age, name and how frequent does they visit the website. 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. Alongside with the common general questions we also imbibed some questions that relate to the usability measurement of the website. The questions are presented below and the corresponding need for particular question.

|  |  |  |
| --- | --- | --- |
| **S.No** | **QUESTIONS** | **PURPOSE OF THE QUESTION** |
| 1. | The average number of clicks that are required by the user to reach the required book from the home page. | We releated this question to understand the navigation of the website. We framed this question in oreder to relate to the three clicks count metric. |
| 2. | How much time does it usually taken to get the response for the posed query. | This question is important as it elaborates the usability of the website.  The time take by the maintenance team to give the feedback for the posed question by the user has effect on the website usability measurement. |
| 3. | On a scale of 1 -5 how easy is the website typography, language and book displayed is it understandable.(5-very easy, 4-easy,3-sufficient,2-satisfactory,1-difficult) | This help in understanding the readability of the website. |
| 4. | If there are any changes that are necessarily made on the design part of the website for interest among users. Are these changes notified to the users. | The question is important to the adults as they can now see and understand the changes made to the website and the maintance team can be given feedback if there is further still any improvement that are to be made. |
| 5. | Do you think the current search option was better to obtain the required book that is intended was this search option really helpful, More over the buttons MY Account and Sign on are they understandable? | Certain users usually habituated to sign in and signup links to create and ;login into the account. The traditional buttons. Even the search space given for Author, Title, Keywords etc was that way easy enough or still there is another way required from user perspective can be known. |
| 6. | On a scle the design changes that are made on the website are they good enough?(5-excellent,4-very good,3-good,2-satisfactory,1-poor) | To understand whether the changes made on the website are understood and the users liket he new look of the website. |
| 7. | Can this website easily found on the search engine while typing the url while searching over the internet? | The success of the website is interlinked with the usability of the website. …The total number of index pages defy the actual success of the website. |
| 8. | On the scale of 1-5 how it is easy to understand the buttons on the website?(5-very easy,4-easy,3-sufficient,2-satisfactory,1-difficult) | The buttons play a key role with respect to the success of the website. |
| 9. | On what scale do you give rating to the availability of the required book that you want is available when correct string or keyword or author name is given Do you find the book you want to read? (5- very easy,4- easy,3- difficult,2-poor,1-hard) | T\It helps to understand that the availability of the books in the website and the usefulness of the website such that if more and required books are easily available the intended users intention to use the website to search and read the books or buy them increases. |
| 10. | Is the website running without any flaws or in genral are there any other problems minute that are to be considered while developing the website? | This helps to understand the small problems that the web developers are unable to notice and also thus helps in much more accurate improvisation of the website design by removing the small flaws also. |

1. **Proposed Empirical Study**

The purpose of conduction 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 small web company is called……. ,this small web company is currently at the capability maturity model (CMM) level 4. 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.

1. **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 ……. 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 usefl 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 in terms of design perspective. 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. Children, adults and parents are the three classes that visit the website. Therefor 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 with 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 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 cse 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.

1. 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. This process of getting the required book is time bounded.
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 discarede when the data is collected.
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.
6. **SUMMARY**

This section deals with the summary f the complete usability measurement of the online book store….. The initial phase or part one 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.