The Evaluation of WebCost Using Software Usability Measurement Inventory (SUMI)

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ABSTRACT

One of the crucial matters in software development is to what extent users can satisfy with the interfaces and functions provided. In order to measure whether the users are satisfied to use the software or tools, we need to evaluate the product before handover to the customer. However, the tools or instrument to be chosen to evaluate the product is still unresolved. In this paper, Software Usability Measurement Inventory (SUMI) is used to evaluate a tool for cost estimate called WebCost. WebCost is the stand alone application that developed by using Java programming language. A set of questions that adopted from SUMI instrument was used. The result shows WebCost provides easier interfaces and produces accurate cost estimation results.

KEYWORDS

Cost estimation, Web-based application, Usability, Interfaces, Software Development

1 INTRODUCTION

In developing software or a product, consumers' acceptance of products is very important. Basic idea that needs to be considered is about the nature of the product interface and the correctness to produce an expected output. If we ignore these two aspects, we can assume that these products are of poor quality and

make no meaning to the users. Therefore, before a product is widely used, some assessments need to be evaluated. In evaluating of this product there are several measurement tools that can be used such as UAT, SUMI and others. Therefore, usability is becoming an area that is beginning to reach those who would not previously have thought that understanding these issues was relevant to their work, example e-learning service providers and web designers [7], [8]. It is becoming apparent that for e-learning websites to be usable, an understanding of what students expect from the site, how they learn, what motivates them, and what helps them to achieve their learning goals is needed [1]. In this paper, SUMI is selected to serve as evaluation tools to measure effectiveness in terms of interface and provide precise results.

2 SUMI EVALUATIONS

The method selection generally depends on what is being evaluated, the software and hardware used, users that are tested and the research budget. In this case, Software Usability Measurement Inventory (SUMI) method is used [2], [3], [4] which was developed in the project 'Metrics for Usability Standards in Computing' (MUSiC, CEC ESPRIT project number 5429) by the Human Factors Research Group (HFRG), University College, Cork. Software Usability Measurement Inventory (SUMI) is a solution to the recurring problem of measuring users' perception of the usability of software. It provides a valid and reliable method for the comparison of products and different versions of the same products, as well as providing diagnostic information for future developments [6]. SUMI provides

an objective way of assessing user satisfaction with the software. This common usability instrument is composed of a validated 50-item paper-based questionnaire in which respondents score each item on a three-point scale which are agreed, undecided and disagree [9], [10]. The following are some example questions provided in SUMI.

- The way the tool information is presented is clear and understandable.
- There is enough information on the screen when it is needed.
- I think this tool is consistent
- I can understand and act on the information provided by this tool.
- This tool is the norm when I want to do something which is not standard.
- There are fewer instructions to be read before you can use the tool.
- Tasks can be performed in a straightforward manner using this tool.

The questionnaire is designed to measure the effects, efficiencies, simplicity, helpfulness and control of a product [3]. During its development, the questionnaire was standardized as a measurement tool for some of the user-orientated requirements expressed in the European Directive on Minimum Health and Safety Requirements for Work with Display Screen Equipment (90/270/EEC).

SUMI is also mentioned in the ISO 9241 standard as a recognized method of testing user satisfaction [5]. Users normally need about ten minutes to complete the inventory. In a software development environment if the users have no previous experience of the

software, additional time is needed for introduction, training, and carrying out a set of benchmark task with the software. Benchmark tasks refer to tasks that reflect the realistic context of use of the software. These tasks are usually written as scenarios, or tasks that are embedded within a real world situation. How long this takes depends on the complexity of the software being evaluated and may be from 20 minutes to more than an hour.

3 SOFTWARE ENVIRONMENT

WebCost is a tool developed by using Java programming language and Eclipse editor which is a standalone application. It has 6 modules which are project description, calculate function-point, calculate cost adjustment, calculate reuse, calculate cost-driven and produce reports. User needs to enter some input in each module and finally the result will be calculated and present in report modules. Figure 1 shows the use case of WebCost.
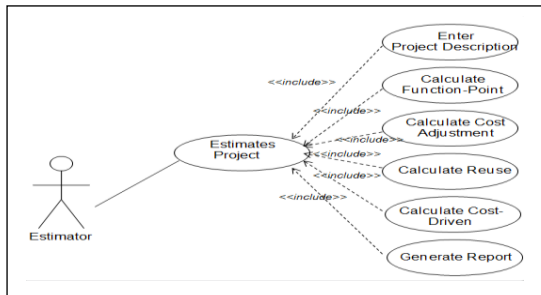

Figure 1: Use Case of WebCost

4 METHODS

Usability testing of WebCost was done by meeting the respondent physically. During the meeting, the researcher brought questionnaires and the CD that consists of the tool.

The evaluation process was done by the software developers and project managers.

The researcher met with the respondents for 10 minutes to explain the purpose of the evaluation and describe the methodology of SUMI evaluation. Throughout the detailed explanation about evaluation session, the participants received verbal instructions from the researcher. The researchers were present to assist with any difficulties with the questionnaire and to answer questions as they possibly arose. In the second phase, the users were asked to complete the SUMI questionnaire for user-interaction satisfaction. The evaluation sessions lasted about 20 minutes each. During the sessions users were not allowed to ask the evaluator questions.

4.1 Participants

The WebCost tool was tested by 13 individuals who consist of software developers and project managers. The participant was chosen from several local companies including IBM, HeiTech Padu, Mesiniaga, KISL Technology Center SdnBhd, Software Village and Aerosoft IT Sdn Bhd. From 13 questionnaires, 8 are a project manager and 5 are a software developer. The participants included mostly adults, who were more than 3 years in software development. The age range of the participants was 25 to 40. As part of the recruiting process, we ensured that all participants had some basic computer and software development process. The feedback is very important in order to investigate the usability of the WebCost.

4.1 SUMI Questionnaire

SUMI questionnaire was developed for measuring the usability. The SUMI questionnaire includes as already mentioned 50 items for which the user selects one of three responses ("agree", "don't know", "Disagree"). The statements presented to the participants are about their attitudes to the software they have just used. 20 questions were selected from SUMI..

5 RESULT

For the analysis purpose, certain value is assigned to each scale as shown in Table 1. The average is gathered from the summation of input from the respondents. If the result is between 1.00 and 1.99, it shows user satisfied and agreed with the specific measurement of WebCost. If the result is between 2.00 and 3.00, it shows the user is less agree (undecided) and if the result is between 3.00 until 4.00, it shows user totally disagree with the WebCost. Table 2 shows the details of the result.

Table 1 : Attribute in Evaluation Form

Scale	Agree	Undecided	Disagree
Value	1.00 – 1.99	2.00-3.00	3.00-4.00

Table 2: Result of User Evaluation Test

Questions	Result (Average)
Respond Faster To Input	1.08
Instruction and Prompt Helpful	1.15
Easy in Learning to operate	1.54
The information is helpful	1.46
Take less time to learn the tool	2.00
The tool is Satisfying	1.00
Information Presented is Clear and Understandable	1.23
Enough Information When	1.96

Needed	
The tool is consistent	1.31
Can Understand and Act on The Information Provided	1.23
The tool is Norm	1.85
Less to Read	2.77
Tasks can be performed Straightforward	1.38
The tool is not frustrating	1.23
The tool had overcome the problem	1.38
Organization of the menu is logical	1.00
Can be economic of keystrokes	1.46
Less step required	2.92
Easy to make tool do exactly what we want	1.08
Accurate Result	1.15

From the Table 2, users' feedback can be categorized into two categories namely agree and undecided. No feedback goes to disagree group. Figure 2 shows the summary of average in agreeing and and Figure 3 shows the undecided group, respectively. Out of 20 questions, the respondents could not indicate the feedback in three questions which are taking less time to learn the tool, less to read and less steps required. This is because WebCost dealing with multiple parameters to be understood, to be read and to be input.
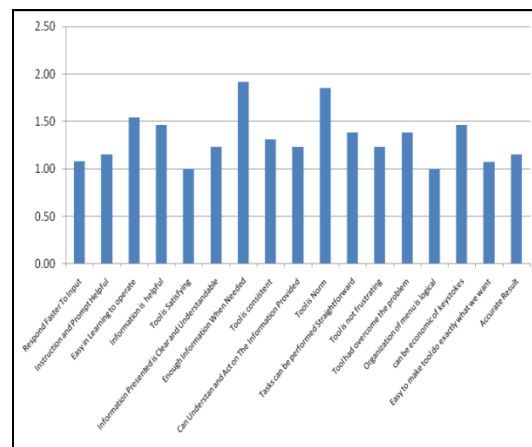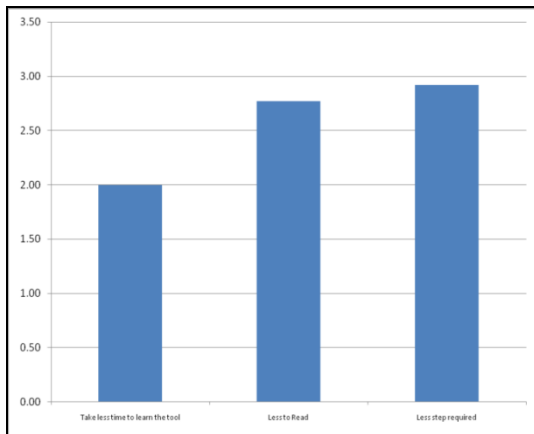

Figure 2: Evaluation Result (agree)

Figure 3: Evaluation Result (undecided)

Overall, the results show that respondents are satisfied with WebCost and they considered that WebCost is usable.

6 CONCLUSIONS

The purpose of this paper is to evaluate usability of WebCost by using SUMI instrument. It provides a better understanding of the cognitive mechanism underlying the observed effects and correct information. The findings and the evaluation result of WebCost provides important information to the researcher in terms of usability and satisfaction of the user when they use WebCost for cost estimation process in a web-based project. In conclusion, SUMI analysis shows that WebCost provide a good interface besides producing accurate cost estimation results.

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