

Information System Evaluation For Website Usability At The Higher Education

Kasmawi ¹⁾

Departemen of Informatics,
Bengkalis State Polytechnic
Bathin Alam street, Bengkalis
e-mail: mawipb@gmail.com ; m7wie@yahoo.com,

Mustafid ²⁾ Oky Dwi Nurhayati ³⁾

^{2) 3)} Master of Information System,
Diponegoro University Semarang
Imam Barjo SH, Street No. 5 Semarang
e-mail: ²⁾ mustafid55@yahoo.com,
³⁾ oky_0210@yahoo.co.id

Abstract—Website Usability Evaluation (WEBUSE) was conducted to determine the success of the website interact with users of the usability aspect. Feed back from users based on the experience of using a website to measure user satisfaction. Results of the evaluation can be further improves recommendations. The purpose of this research is to create a information systems for evaluating the usability by using the WEBUSE method on higher education, base on 23 usability criteria classified into 5 usability categories namely, Content, organization, and readability, Navigation and links, User interface design, Performance and effectiveness, and Educational purpose. Each category deals with one usability aspect. Data of responden's answer were analyzed by using the WEBUSE method to earn usability point and usability level from the website. This research resulted information system of evaluation usability we-based that provides online evaluation questionnaire and this analysis to present information high quality system and users satisfaction of usability aspect on higher education website. Case studies on the website msi.undip.ac.id showed that the overall usability level is good and acceptable to student. Usability level of user satisfaction parameters, content, navigation, and the interface is relatively good.

Keywords-Usability evaluation, WEBUSE method, website usability, website higher education.

I. INTRODUCTION

Website Usability is a quality factor of system which represents a response of human interaction with technology. This illustrates the quality of systems from human perspective that use it [10]. Development of website usability has to go through some usability guidelines to ensure that the purpose of the website required can be achieved [16]. Therefore the achievement of website usability development requires a combination of planning in understanding the context of use of system as the basis for identifying and evaluating the system through user testing [9]. Figuring out a system can be used by users effectively, efficiently and contentedly is to conduct an evaluation of website from the aspect of usability [2].

Usability evaluation on college website aims to determine the level of website quality in interacting with users from the aspects of usability [10]. Feedback from

users based on the experience of using a website measures the user satisfaction in using an efficient website, easy to use and meet the users' expectations [2]. By evaluating website usability, it can determine the level of quality system and user satisfaction from usability aspect [8].

Website Usability Evaluation Methods (WEBUSE) focuses on developing web-based usability evaluation system. WEBUSE method can be used to measure the system quality and user satisfaction from usability aspects [4].

The purpose of this study is to develop an information system to evaluate the usability by the method of WEBUSE on the college website.

II. FRAMEWORK

Usability method with user analysis can be used to evaluate the college website [8]. Some research university website usability evaluation from the aspects of usability such as usability evaluation on college website in Bangladesh uses a questionnaire-based usability evaluation method and automated tools include user satisfaction parameters, legibility and navigation using 23 criterion related to usability aspects. In general, the result of usability evaluation does not have good features. Evaluation results uses automated tools showed that the quality of the website is not ideal [8].

Usability evaluation at Delta State Polytechnic website used automated tools and methods based evaluation parameters questioner with user satisfaction. Evaluation showed that the rate of the overall usability of the website can be accepted. However, there are a few disadvantages of usability from the aspects of interface and performance [15].

Unlike the usability evaluation of Croatia web portals. Evaluation of web portals used user-based method with dimensions Software Usability Scale [3] and usability inspection methods with laboratory-based testing. Data analysis applied descriptive statistics. It has shown that the chosen research instrument, measurement and evaluation methods for user-based evaluation was good enough and produced evaluation of web portals was quite clear [6].

Website usability is able to measure the quality of the user experience when interacting with the system [18]. International standards (ISO 9241-11) usability as a system can be used by the user in a certain context with effectiveness, efficiency and satisfaction [5]. To achieve effectiveness is defined as the accuracy and completeness of users to achieve the target set. Meanwhile, efficiency is resources issued with respect to the accuracy and completeness of users to achieve the goal, and satisfaction are described as comfort and acceptability [10]. Although the recommendation ISO 9241-11 has been the standard for usability expert's community, came up with five usability attributes based on the evaluation of website usability, namely [11]:

- *Learn ability*: to explain the level of user convenience in studying the website to fulfill basic tasks when first using the website.
- *Efficiency*: to explain the level of the user's speed in completing tasks after studying the website.
- *Memorability*: to explain the level of user convenience in using the website well, after a long time did not use it.
- *Errors*: to explain the number of mistakes made by users, and how users rectify errors easily.
- *Satisfaction*: to explain the level of user satisfaction in using the website.

Website usability is an indicator of the success of a website to interact with the user in performing a particular task easily [1]. Success Measurement of website usability is viewed from how well a website to provide quality services to users, reduce the possibility of errors in the system, facilitate the learning process and use efficiently the website so that users feel satisfied with the website. Enable to determine the quality of the website to interact with the user is to conduct evaluations of website usability aspects [17].

Website usability can be used to improve user satisfaction. In addition, website usability can also provide benefits for website developers to reduce the maintenance costs [7]. Website usability is very important so that a website is able to continue to be accessed. Websites that have high usability will have the opportunity to visit more often. Generally, users intend to get the information quickly. If a website fails to provide clear information from that site, user will immediately leave the website and switch to another website [12] [13]. WEBUSE method was developed by [4] focuses on the development of a web-based evaluation system to evaluate the usability of website from usability aspects. WEBUSE method can evaluate aspects of website usability on all types of web and domain. WEBUSE methods developed related to website usability, including the concept of usability methods, evaluation and evaluation system. Questionnaire-based usability evaluation method lets the user perform an evaluation to assess the usability from evaluated websites concern. Results obtained from respondents' answers to the questionnaire responses are

analyzed using the method WEBUSE. Steps for website usability evaluation are as follows:

- Respondents choose website
- Respondents answered evaluating questionnaire website usability
- Answer of respondents is sent to the server for processing evaluation system websites
- Merit based on the answers of the user used for each question, and then accumulated for each category of usability
- Points usability category is the mean value of each criterion
- Point usability of the website is the mean value of each category
- Level usability point is determined based on usability

Five options are available for each question. The option and corresponding merits can be seen in Table 1.

TABLE 1. OPTION FOR QUESTIONNAIRE AND CORRESPONDING MERIT [4].

Option	Merit
Strongly Disagree	0.00
Disagree	0.25
Fair	0.50
Agree	0.75
Strongly Agree	1.00

Merit determined by the response to each question. Then the merit is accumulated by 5 categories of usability. Mean values for each category are considered as the usability points for each category. Usability points for the x category, is defined as follows:

$$X = \frac{\sum(\text{Merit for each question of the category})}{[\text{number of questions}]} \quad (1)$$

Results overall usability point is the mean value of point website usability for 5 usability categories. Level of usability based on the amount of usability points. Table 2 shows the usability levels and corresponding usability points.

TABLE 2. Usability Points and Corresponding Usability Level [4].

Point x	Usability Level
0<=x<=0.2	Bad
0.2<=x<=0.4	Poor
0.4<=x<=0.6	Moderate
0.6<=x<=0.8	Good
0.8<=x<=1.0	Excellent

The end result of usability evaluation usability is generally in the form of evaluation reports of 5 categories usability. Table 3 shows the results of the evaluation report website usability.

TABLE 3. WEBSITE USABILITY EVALUATION REPORTS GENERAL [4].

Usability Categories	Usability Point	Usability Level	Detailed Report
Content, organization, and readability			View
Navigation and links			View
User interface design			View
Performance and effectiveness			View
Educational purpose			View
Overall			

III. METHODOLOGY

Research procedure has the sequence of steps that are presented in Figure 1. In the early stages it starts from problem identification and determination of the college website domain of usability aspects. Determination of relevant usability evaluation method refers to the method of WEBUSE [4]. Data are collected by the method of interviews, library studies, and test pilot. Pilot test is used to determine the validity and reliability of the questions posed can be answered by the respondents that deserve to be measuring instrument in research. Sampling technique is used is Purposive sampling method based on the characteristics of the elements defined target population or adapted for the purpose of research problems. Sampling is deliberately used to determine opinions about usability with the assumption that users will be more aware about the usability of the website [14]. Sample size (n) as many as 73 students. Data collection used questionnaire-based usability evaluation method online that was given to students of Master of Information Systems University of Diponegoro. Validity test of the questionnaire evaluation used Karl Pearson coefficient, whereas the test reliability used coefficient alpha (α) cronbach. Application processing sample data used SPSS version 17 for Windows.

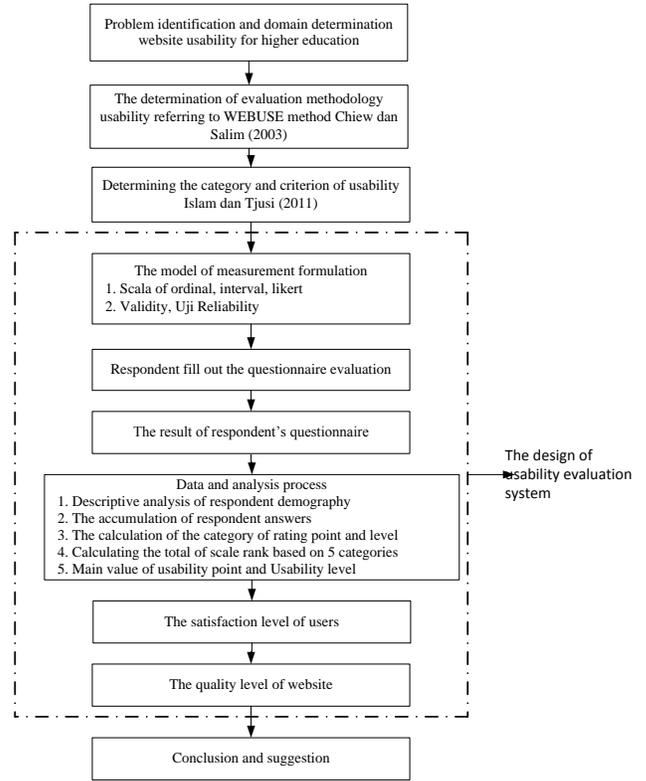


Figure 1. Research procedures

The questionnaire used is designed according to usability criteria for evaluation. In this case usability parameters consist of the user satisfaction, content, navigation and interface and other aspects related website of Master of Information Systems of Diponegoro University. These parameters are identified and analyzed by using the method of WEBUSE. The questionnaire was written in two different languages (Indonesian and English). The questionnaire was divided into two main parts. The first section includes 30 questions used to evaluate the usability of the website Master of Information Systems of Diponegoro University. The second section examined the characteristics of participants, including: name of the university, faculty, courses, education level, age, gender, computer and internet experience, and frequency of accessing the university website.

Determining criteria of usability for evaluating college's website usability was identified in 23 usability criteria. This criterion indicated that criteria would have relevance between more than one category of usability related to the aspects of usability [8]. Usability criteria are shown in Table 4.

Usability criteria load the most important aspects of website usability. From 23 criteria classified into 5 categories usability [8].

1. Content, organization, and readability (CAT1)
2. Navigation and links (CAT2)
3. User interface design (CAT3)
4. Performance and effectiveness (CAT4)
5. Educational purpose (CAT5)

Types of questions about the forming indicator criteria presented in the usability category by using a model of multiple choices. Answers model for multiple choice questions is in the form of a five-point liker scale: i.e. Strongly Agree, Agree, Fair, Disagree, and Strongly Disagree [8].

The next stage is creating web-based usability evaluation system consisting of a web administrator interface and interface evaluation questionnaire survey. Processing data and analysis used the methods of WEBUSE [4]. Results of the research were in the form of some conclusions and suggestions of the aspects of usability.

TABLE 4. USABILITY CRITERIA [8]

No	Usability Features
1	Display space
2	Scroll left and right
3	Accessibility
4	Distracting or irritating elements
5	Orphan page
6	Placement and content of site map
7	Information search
8	Link colours
9	Up-to-date information
10	Download time
11	Back button
12	Open new browser windows
13	Respond according to users' expectations
14	Web advertising
15	Follow real world conventions
16	Hyperlink description
17	Consistent design
18	Use of colour
19	Organisation of information
20	Navigational aids
21	Registration information
22	Faculties information
23	Instructors information

IV. RESULTS AND DISCUSSION

A. Result

Usability evaluation of information systems web-based is executables built using the PHP language that works on the server and MySQL as database server. The research used a case study on the website of Master of Information Systems, University of Diponegoro. Framework of information systems can be shown in Figure 2.

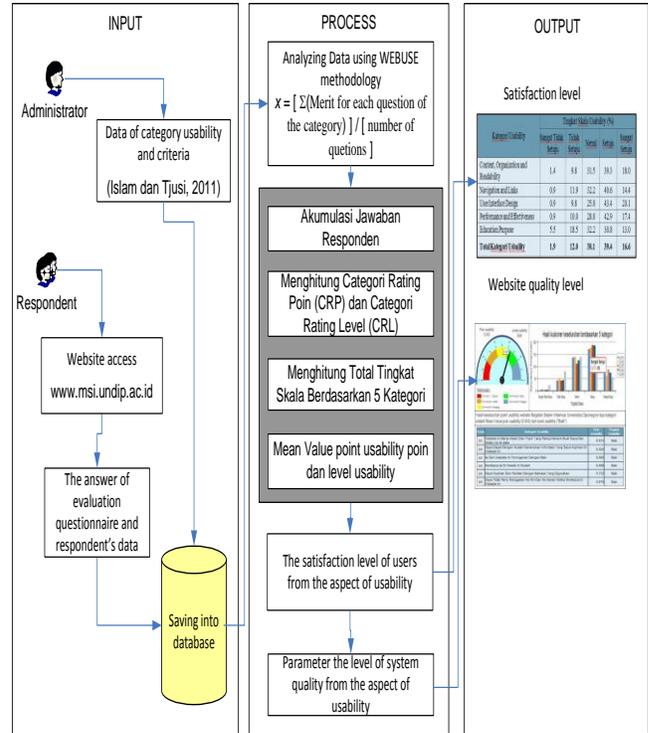


Figure 2. Framework of usability evaluation system

Usability evaluation system is a system which provides information about the quality level of the system parameters and user satisfaction of the college website. Input of the systems in the form of data usability criteria and usability categories. While the input data from respondents is in the form of response and respondents' data from questionnaire of evaluation.

Results obtained from respondents' responses against evaluation questionnaire by using the method of WEBUSE. The output of the system is the level of quality parameters and user satisfaction of the usability category which is shown in the form of tables and graphs in the form of the dashboard.

B. Discussion

Evaluation questionnaires were conducted to determine the usability of user opinions about msi.undip.ac.id website. Some students of Master of Information Systems, University of Diponegoro randomly selected to participate in online evaluation questionnaires. In this questionnaire involved statements based on a Likert scale response options, namely, (SD)= Strongly Disagree, (D)=Disagree, (F)=Fair, (A)=Agree, and (SA)= Strongly Agree. The two languages are used (Indonesian and English) each has the same question. To maximize the response rate students were asked to participate in the questionnaire through face-to-face, social network, Sort Message Service, telephone, and were given an explanation of the purpose of the study. Next, participants filled out and complete the online evaluation questionnaires based on knowledge and experience in the

use of the website usability aspect. Testing usability evaluation questionnaire applied validity and reliability instruments. Deployment of evaluation questionnaires was performed online to the students of Master of Information Systems who were randomly selected. Results of validity and questionnaire reliability usability evaluation questionnaire test were valid and reliable and they could be used as a data collection.

A total of 73 respondents from the students of Master of Information Systems, Diponegoro University had completed the questionnaire evaluation based on their beliefs against the usability of the website www.msi.undip.ac.id through questionnaire-based usability evaluation survey online. Answer from the evaluation survey data processing and analysis also by using the methods of WEBUSE. From the results of the analysis showed that the majority of respondents those ages ranged from 26 to 35 years consisting of 68.49% men and 31.51% women. Most of the respondents had experience of computer and internet more than 4 years. 90.41% of respondents had computer experience and 90.41% of respondents had Internet experience of 4 years or more. 43.84% of respondents with weekly frequency visited the website msi.undip.ac.id and 9:46% of the respondents with monthly frequency.

Table 5. shows a summary of the results of the user level satisfaction from 5 categories which related to college website usability from parameter content, navigation, and interface. User Interface Design Usability category (CAT3) has the highest category with the value of 20.1% from the students who choose the level of scale "strongly agree" followed by Content, Organization and Readability (18.0%) (CAT1), Performance and Effectiveness (17.0%) (CAT4), Navigation and Links (14.4%) (CAT2), and Education Purpose (13.0%) (CAT5) for each category of usability.

TABLE 5. WEBSITE EVALUATION BY RESPONDENTS

Usability Category	Scale Level (%)				
	Strongly Disagree	Disagree	Fair	Agree	Strongly Agree
CAT1	1.4	9.8	31.5	39.3	18.0
CAT2	0.9	11.9	32.2	40.6	14.4
CAT3	0.9	9.8	25.8	43.4	20.1
CAT4	0.9	10.0	28.8	42.9	17.4
CAT5	5.5	18.5	32.2	30.8	13.0
Total	1.9	12.0	30.1	39.4	16.6

Based on 5 items likert scale: strongly disagree, disagree, neutral, agree, and strongly agree indicates that the level of student satisfaction overall usability of the website is 1.9% strongly disagreed and 16.6% strongly agreed each category. In comparison, 12.0% disagree, 30.1% neutral and 39.4% agreed to usability. Overall results showed that students were satisfied with the usability category on msi.undip.ac.id website.

Overall Results of the website quality level of usability can be summarized in Table 6. Each category describes the level of usability and usability point of msi.undip.ac.id website. Range between usability points for the 5 categories usability ranged about 0588-0689 with the level of usability is "good". Points usability of user interface design category (6.80) (CAT3) showed the highest evaluation score, followed by the category of Performance and effectiveness (664) (CAT4), Content, organization and readability (0657) (CAT1) and Navigation and links (0639) (CAT2), and the level of usability is "Good". While the point of category usability Education purpose (0.568) (CAT5) and the level of usability is "Moderate". Overall points of website usability are "0642" and the level of usability is "Good".

TABLE 6. USABILITY LEVEL AND USABILITY POINTS FOR 5 CATEGORY

Usability Category	Usability Point	Usability Level
Content, Organization and Readability	0.657	Good
Navigation and Links	0.639	Good
User interface design	0.680	Good
Performance and effectiveness	0.664	Good
Education purpose	0.568	Moderate
Overall	0.642	Good

It can be concluded that the website of Master of Information Systems, Diponegoro University can be accepted by the student to the level of usability is "good" based on usability scale.

V. CONCLUSION

Usability evaluation system provides a web-based usability evaluation that can be accessed online by users as respondents. Usability evaluation systems produce information in the form of quality level parameters and user satisfaction on website usability aspects in the college website.

WEBUSE method based on 23 criteria of usability which are classified into 5 categories of usability can generate usability points and usability level on college website. The analysis results by using the method of WEBUSE from case studies on the website msi.undip.ac.id showed that overall level of website usability is good and acceptable to users. Meanwhile, the level of usability from the parameters of user satisfaction, content, navigation, and the interface is relatively good and acceptable to users.

From this study, it is clearly that WEBUSE methods can still be developed by evaluating some college websites from the aspect of usability that can compare to achieve competition among college website in order to meet user satisfaction.

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