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Implementation of Usability Testing in Learning Information System (Study Case : E-sorogan Universitas Nahdlatul Ulama Surabaya)

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Abstract

The aim of study is to evaluation learning information system in Universitas Nahdlatul Ulama Surabaya. The system is called E-sorogan. The evaluation focuses on satisfaction aspect using usability testing. The method is Poststudy System Usability Questionnaire (PSSUQ) questionnaire. PSSUQ consists of overall satisfaction score, system usability, information quality and interface quality. The result shows that the satisfaction aspect with scale value on quality system is 2.50 of 3.62, quality information is 2.48 of 3.24, quality interface is 2.62 of 2.71, and overall is 2.49 of 3.02. It can be concluded that the level of user acceptance of E-sorogan is satisfied.

Keywords*: Usability testing, PSSUQ questionnaire, satisfaction, learning information system, user acceptance*

1. Introduction

Nowadays, all the system is being transferred into automated systems. System can save cost, time and also increase productivity of any business [1]. But system need to be evaluated. The purpose of system evaluation is to determine the quality of the system. There are many factors or characteristics to evaluate the quality of the website. Usability is one of important criteria to measure system quality [2]. According to Jakob Nielsen, usability is most significant aspect to attract your customer who wish to acquire information or services through your system [3]. 40% of users usually will not visit the site again if they are not satisfied with it at the first visit [4]. Software development companies usually conduct usability testing to determine the realistic usefulness of their products before deploying them into the real field [5]. Usability testing is a technique to get direct opinion from the users by assigning them different tasks on real system and taking feedback. The result of usability testing provides the indication of the essential quality for the client to decide whether to approve or to deny the product [6].

Ref [7] using usability testing to measure the level of usability and the level of user satisfaction of the BSI mobile bangking application. The result show that the matrix satisfaction is included in the acceptance category and gets a good rating. Result of usability testing have some useful purpose such as a guideline for the improvement of application likes done by Ref [8] while evaluation on JIBAS computer based exam application, the improvement of application can make changes to application to be more user-friendly designs [9] while evaluation video game application, to determine the system's performance based on user experience [10].

Focuses of system in this study is E-sorogan, a learning information system is used in Universitas Nahdlatul Ulama Surabaya. E-sorogan is information system based website and be accessed in https://esorogan.unusa.ac.id/. The features consist of creating question banks, teaching schedules, student attendance, adding materials and assignments, and adding online lecture zoom links. Since system is built until

now, this system never be evaluated in user acceptance aspect. So in this study will evaluation E-sorogan using usability testing to determine user acceptance of system.

2. Materials and methods

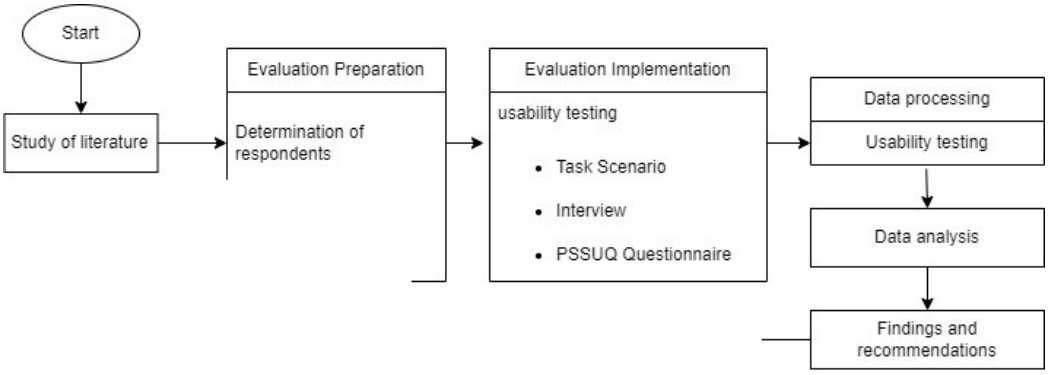

Fig. 1 Methodology Research

According to Fig. 1, The methodology research in this study consist of some stages such as study of literature, evaluation preparation, evaluation implementation, data processing, data analysis, and recommendations. At the literature study stage, the aim is to looking for a theoretical basis related to research to support problem solving. The sources are taken from various scientific journals, printed books, scientific articles or websites regarding usability testing. The next stages are evaluation preparation to determine respondent. The respondent is lecturers from five faculties in Universitas Nahdlatul Ulama Surabaya. The number of respondents is 15 respondents. Based on Nielsen, five users were enough to find 85% of usability problems. With small number of users, it can reduce excessive costs and time [11].

In the third stages, evaluation implementation there are three methods to collecting data. First data is Poststudy System Usability Questionnaire (PSSUQ). PSSUQ is used to investigate satisfaction after users using system [12]. The 16-item PSSUQ evaluated the system overall usability. The questions in PSSUQ questionnaire is shown in Table 1. The questionnaire was a seven-point likert scale in which point 1 indicated totally diasagree and point 7 indicated totally agree. There were four dimensions such as system usefulness, information quality, interface quality and overall evaluation. The second methods are interview. Interview is one of methods to obtains greater depth of information from one or more individuals [13]. The last methods are task scenario. A task scenario is created to application testing. The tasks is related to features in E-sorogan website as an e-learning system application at UNUSA. Task scenario is shown in Tabel 2.

TABLE I. PSSUQ QUESTIONNAIRE

No	Questions
1	Overall I am satisfied with e *-sorogan's ease of use*
2	*e-sorogan* website is simple to use.
3	I can complete assignments and scenarios quickly using this *e-Sorogan website* .

No	Questions
4	I feel comfortable using this *e-sorogan application*
5	Using the *e-Sorogan website* is easy to learn
6	I'm sure I can be productive quickly using this *e-Sorogan website* .
7	*e-sorogan* website gave a clear error message telling me to fix the problem
8	Every time I make a mistake and use the *e-sorogan website* , I can fix it easily and quickly
9	Information (such as online assistance, screen messages, and other documents) is clearly provided by this *e-Sorogan website* .
10	I find it easy to find the information I need on the *e-Sorogan website* .
11	The information on the *e-Sorogan website* is effective in helping me complete my assignments
12	The information arrangement on the screen of the *e-Sorogan website* is clearly visible.
13	The interface of the *e-Sorogan website* is pleasing to the eye.
14	I like using the interface of this *e-Sorogan website*
15	*e-Sorogan* website has all the functions and capabilities I expect.
16	Overall, I am satisfied with this *e-sorogan website* .

TABLE 2. TASK SCENARIO

No.	Code	Task skenario
1	T1	Uploading lecture materials on e-sorogan, accompanied by material links according to the schedule. Pre Condition: Have uploaded the material that will be taught on Gdrive and copy the material link to be embedded in the link form material on e-sorogan
2	T2	Carry out attendance attendance activities after lecture is finished.
3	T3	Make assignments for lectures collected via e-sorogan.

In the data processing stages, result of PSSUQ questionnaire is analyzed. Result of analysis are the average score for each question in each category. The average score is calculated using Equation 1. The average score will compare with the standard of PSSUQ scale value is shown in Tabel 3. In the last stages, recommendations is made as guideline to developer system to be better application.

$$Scale = \frac{the\ number\ of\ respondents\ ratings\ of\ each\ sub-scale}{the\ number\ of\ question\ item\ numbers\ for\ each\ sub-scal} \quad (1)$$

TABLE III PSSUQ SCALE NORMS

Categories	Rating Scale	Lower limit	Average	Upper limit
System usefulness	Average questions 1-6	2.57	2.8	3.62
Information quality	Average questions 7-12	2.79	3.02	3.24
Interface quality	Average questions 13-15	2.28	2.49	2.71
Overalls	Score questions 1-16	2.62	2.82	3.02

3. Results and discussion

A. Evaluation Preparation

1. Determination of Respondents

After collecting data on the number of lecturers in the UNUSA environment, it was found that the number of lecturers was 234 active teaching lecturers from 5 faculties, it was determined that the number of respondents taken in accordance with the research provisions was as many as 15 teaching lecturers at random. The following is the identity of the lecturer as a respondent in this study:

B. Evaluation Implementation

1. *Usability Testing* Evaluation

In the implementation of *usability testing*, respondents filling out the PSSUQ questionnaire and interviews conducted. The documentation of process respondent filling PSSUQ questionnaire is shown in Figure 3. In interview, respondents are given a number of questions related to their satisfaction and problems encountered while using the e-Sorogan website to find detailed information and take criticism and suggestions for the e-Sorogan website.

C. Data Processing and Evaluation

a. SysQual Scale

The SysQual scale is a scale that evaluates the quality of the system. Questions on this scale consist of questions numbered 1 to 6 which are summed up and then divided by the number of questions on the SysQual scale. Based on table XII, the results of the SysQual scale get an average value of 2.50. So the level of the System Quality scale is included in the good category.

TABLE IV SYSQUAL SCALE

No	Respondent Code	Question						Average SysQual
		P1	P2	P3	P4	P5	P6	
1	R1	2	2	1	3	2	2	2.00
2	R2	2	3	3	2	3	3	2.67
3	R3	4	4	4	4	4	4	4.00
4	R4	3	3	3	3	2	4	3.00
5	R5	2	1	2	2	1	3	1.83
6	R6	2	3	3	4	4	4	3,33
7	R7	3	3	4	4	3	4	3.50
8	R8	1	1	1	1	1	1	1.00
9	R9	3	3	3	3	4	4	3,33
10	R10	2	2	1	3	2	2	2.00
11	R11	2	2	2	2	2	2	2.00
12	R12	2	3	2	2	1	1	1.83
13	R13	3	3	3	3	4	4	3,33
14	R14	2	2	2	2	2	3	2,17
15	R15	2	2	1	1	1	2	1.50
Average								2.50

b. InfoQual Scale

The InfoQual scale is a scale that evaluates the quality of information. Questions numbered 7 to 12, then divided by the number of questions on the InfoQual scale. Based on table XIII, the InfoQual scale results obtained an average value of 2.48. So the InfoQual scale level is included in the very good category.

TABLE V INFOQUAL SCALE

No	Respondent Code	Question						InfoQual average
		Q7	Q8	Q9	P10	P11	Q12	
1	R1	3	2	2	1	1	2	1.83
2	R2	2	3	2	3	2	3	2.50
3	R3	4	2	4	4	4	4	3.67
4	R4	3	3	1	3	2	2	2,33
5	R5	2	2	2	2	2	1	1.83
6	R6	4	4	4	3	2	4	3.50
7	R7	4	2	2	4	3	3	3.00

8	R8	1	1	1	1	1	1	1.00
9	R9	3	4	4	3	3	4	3.50
10	R10	3	2	2	1	2	2	2.00
11	R11	2	3	2	2	2	2	2,17
12	R12	2	3	4	2	2	1	2,33
13	R13	3	4	4	3	3	4	3.50
14	R14	2	3	2	2	2	2	2,17
15	R15	1	3	3	1	2	1	1.83
Average								2.48

c. IntQual Scale

The IntQual scale is a scale that evaluates the quality of the interface. Questions number 13 to 15, then divided by the number of questions on the IntQual scale. Based on table XIV, the results of the IntQual scale get an average value of 2.62. So the level of the IntQual scale is included in the pretty good category. In table 3.10 the comparison of the respondent's results with the PSSUQ norm.

TABLE III INTQUAL SCALE

No	Respondent Code	Question			Average IntQual
		P13	P14	P15	
1	R1	2	2	2	2.00
2	R2	3	2	3	2.67
3	R3	4	4	4	4.00
4	R4	3	3	4	3,33
5	R5	1	2	3	2.00
6	R6	3	2	4	3.00
7	R7	3	3	4	3,33
8	R8	1	1	1	1.00
9	R9	3	3	4	3,33
10	R10	4	2	2	2.67
11	R11	3	2	2	2,33
12	R12	2	2	1	1.67
13	R13	3	3	4	3,33
14	R14	4	2	3	3.00
15	R15	1	2	2	1.67

No	Respondent Code	Question			Average IntQual
		P13	P14	P15	
Average					2.62

TABLE IIIII COMPARISON OF PSSUQ NORMS WITH RESPONDENT RESULTS

Scale	Rating Scale	Lower limit	Means	Upper limit	Respondent Data
SysUse	Average questions 1-6	2.57	2.8	3.62	2.50
InfoQual	Average questions 7-12	2.79	3.02	3.24	2.48
IntQual	Average questions 13-15	2.28	2.49	2.71	2.62
Overalls	Score questions 1-16	2.62	2.82	3.02	2.49

From the results of data processing, it was obtained that the SysQual scale was below the average lower limit, then for the InfoQual scale it was below the average lower limit, which means that the quality of the information conveyed is very good. Then the IntQual scale is between the mean value and the upper limit which means good in terms of interface appearance . And the Overall Scale is below the lower limit, which means that the average user of the e-Sorogan website is fairly good. In the PSSUQ Questionnaire it has the principle of *lower score high usability,* where if the score obtained is getting smaller then the *usability* is getting bigger [10].

d. Interview result

Interviews were conducted to dig deeper information related to experience in completing assignments whether there were obstacles or other things conveyed by respondents. The results of interview data from 15 respondents can be seen in table XVI.

TABLE IV INTERVIEW RESULTS

Respondents	**Problem**
R01, R05, R07, R09, R14	The lecture teaching sub menu on the lecture menu is rarely used, lecturers prefer to directly choose the same sub menu on the dashboard because it is faster.
R02, R03, R08	Hesitating to choose the activity button on the lecture menu because the button only displays an icon, there is no button name (you have to pointer first)
R03, R05, R06	Mistakenly clicked on the assignment menu containing the status of the assignment
R11	There is a warning that you have not filled out the material form completely
R01, R02, R03, R04 R14	Display is not responsible if the website is accessed using a mobile phone, the display is too small (no application

	version)

4. Conclusion

Usability test on 15 lecturer respondents as e-sorogan users. From the test results, it was obtained the results of the effectiveness criteria for an average success rate measurement with a value of 96% which indicates the level of efficiency in using this website is very effective. Then, the results of the efficiency criteria obtained an average Time Based Efficiency value of 0.027 goal/sec or an average of being able to complete tasks for 119 seconds or about 2 minutes which are categorized as very fast in the time behavior indicator . While the satisfaction criteria have the principle of lower score high usability, where if the score obtained is getting smaller then the usability is the greater with each scale getting a SysQual of 2.50, InfoQual 2.48, IntQual 2.62, and Overall 2.49 with a pretty good average category. From the results of interviews with respondents, it was found that 18 problems were experienced by respondents with the most problems found in the system interface design , so it is necessary to make recommendations for improvement or re-design on several e-sorogan pages, either reducing or adding features as well as layout and other recommendations technically on aspects other than interface design .

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