Usability Evaluation of E-Government: A Case Study of E-Finance

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Abstract— Usability is an important consideration in the design of software product quality attributes. Usability is not only making the system easy to use but the comprehension regarding destination user, context, and experience them. So it is very important to improve the usability of the product by combining the features and attributes known to benefit the user in the context of its use. This study aims to measure the level of usability of e-government website based on four aspects: effectiveness, efficiency and satisfaction (ISO 9241-11) and ease of use (USO), so it can be the assessment of each aspect of are used to improve the system. The standard questionnaire used is UMUX (Usability Metric for User Experience), which consists of 4 item Likert scale (1-7). Furthermore, the results of this study can be used as a base to explore the problem of what happens when users use e-government. The evaluation results can be used to repair the system based on user experience.

Index Terms— E-Government, ISO, Usability, Usability Metric for User Experience (UMUX).

I. INTRODUCTION

E-government involving the use of information and communication technology in the form of web applications to provide services or information faster, easier and more efficient access [1]. Today, thousands of e-government systems can be accessed by using the internet for a wide range of government services and information online [2]. However, e-government more focused on the technology than the user desires [3], thus potentially cause problems in user performance and satisfaction. Measure performance and user satisfaction can be used to measure each component of the work system affect the whole system of work used [4]. Every organization should measure its performance in achieving the objectives. The measurement is useful to assess all the activities that have been performed, both quantitatively and qualitatively [5].

Implementation of e-government is carried out by the Indonesian government still apprehensive. The causes of low implementation of e-government in Indonesia occurred due to the accumulation of various barriers, such as lack of human resources, lack of support from the leaders, cultural issues and so on [6]. One of the efforts conducted by the government to improve services to the public is the use of information technology. One of the cities in Indonesia which trying to be a smart city is Malang City. Malang government to optimize the implementation of e-government and information technology that will improve the performance in terms of effectiveness and accessibility. Implementation of e-government will support the plan also Malang city became one of the smart city in Indonesia. Smart city government provides internet-based services that enable connectivity everywhere is the key to changing the internal processes of government departments, employees and externally to citizens and businesses [7]. E-Finance is one of the applications developed areas to support Malang toward a smart city. These applications introduce accrual-based financial management system is a web-based implementation of the implementation of Ministerial Regulation No. 64 Year 2013 on the application of accrual-based government accounting standards in local government. The accrual basis of accounting which is an economic transaction is recognized, recorded and presented in the financial statements at the time of the transaction, regardless of when cash is received or paid. The use of E-finance at Malang city government has been integrated with 57 villages in Malang for activities related to financial transactions and assets are in the institution. This application is implemented in early January 2015 by socializing and providing training on the functions and how to use them.

In the web application, usability is the most important quality factor [8]. So it is very important to improve the usability of the product by combining the features and attributes known to benefit the user in the context of its use [4]. According to ISO 9241-11 (1998), Usability is "the extent to which a product can be used by specified users to achieve specific goals with effectiveness, efficiency and satisfaction in a specified context of use". When developing a good system, interaction designer, and usability practitioners should be able to solve the usability problems as well as solutions to enhance the user experience [9]. Usability is an important consideration in the design of software product quality attributes. This requirement relates to the extent to which users can work effectively, efficiently with satisfaction [10]. Usability is not only making the system easy to use but includes comprehension destination user, context, and experience them [11]. Usability is an important element in determining the success of e-government [12]. Several other studies that measure the usability of e-government [1] about usability and credibility of e-government website and see the performance of users when using it and evaluate research on healthcare.gov website to find out the problems in the interface design [13].
The study aims to measure the level of usability of e-government that e-finance website based on four aspects: effectiveness, efficiency, satisfaction, and ease of use which is used as an assessment of websites for system improvement. The results are expected to help the government of Malang city to improve the application areas as the implementation of a smart city. One of the ways used to measure the level of usability of a product is to use questionnaires. Usability Metric for User Experience (UMUX) is a standard set of usability questionnaire that has the main objective to get a measurement of the perceived usefulness of the SUS consistency but using fewer items that are closer in accordance with the definition of usability according to ISO 9241-11 (1998) that is effectiveness, efficiency and satisfaction [14]. In this paper, it is used UMUX as a metric for evaluating the usability of e-finance application.

II. METHODOLOGY

A. Case Study

Malang is E-finance. E-finance is the application of accrual-based financial management system based on the web. This application is used by the Finance and Assets Management Agency of Malang City that is directly integrated with each SKPD in 57 villages for the submission of the budget. E-finance can not be accessed in general because using VPN (Virtual Private Network) which aims to keep the system secure, as it relates to all the financial management in Malang. This application was originally built at the request of the mayor of Malang who wished for reporting in real time both cash out or cash-in Malang city government so that facilitate the control of financial management in the government bureaucracy.

Users of this application consist of a wide variety of different backgrounds, both level of education, age, knowledge of information technology and others. So when in early January 2015 was held the socialization of e-finance, many users experience various difficulties and problems when use. The problems that arise include users complain when using this application requires a lot of time because the flow of funds lengthy submission. Based on observations conducted by the researchers found that when the use of e-finance application requires a fairly long procedure starting from filing of the funds until the funds can be received.

Given the importance of an improvement of the system is to be used optimally to support Malang become Smart City, it is necessary an evaluation measure the level of usability of the website. So, it can be known which aspects need to be improved to enhance the user experience. Block diagram E-finance can be seen in Figure 1. E-finance system has two permissions are Treasurer filing of funds and financial treasurer. Treasurer filing of funds is a person who is the operator of e-finance in each village who can access the module fund filings, publish evidence of the transaction, submit a written request for payment, and receive warrant disbursement of funds. The financial treasurer is the treasurer general government finances in Malang city can access the module is between receipt and verification of fund filings, receive and examine the evidence of the transaction, the warrant pay publish, verification of the data and files, and publishing warrant disbursement of funds.

B. Research Methodology

The author conducted a questionnaire survey from July to August 2016. Targeted research is the application of e-finance operator in each village of Malang. This study, there are four steps to measure usability: (1) identifies the context of use, (2) usability measures select criteria and context, (3) evaluate usability, and (4) conclusion. The methodology of this study can be seen in Figure 2.

At the stage of identifying the context of use, the researchers identify the use of e-finance application that integrates with all urban villages in the city of Malang. The application is beginning to be used at the beginning of January 2015 and is one implementation of the embodiment of smart cities in Malang.
from the questionnaires will be analyzed to determine the level usability of e-finance website based on effectiveness, efficiency, satisfaction and ease of use.

UMUX score calculation using the encoding scheme raw item scores of 0-6, is shown in Figure 3 and Figure 4. The UMUX Scores ranged from 0-100 (number four items divided by 24 and multiplied by 100).

C. Participants

The data collection is done by distributing questionnaires to 57 users in the village of Malang. There were 31 all questionnaires distributed. Table 3 displays the demographics of the 31 respondents.

Based on the demographics of the respondents, the users who responded to the male sex was 61% and female 39%. The questionnaires were collected back and contain full answer of the dominant age of the respondents was between 41-50 years. Qualification and work are dominated undergraduate and finance department in the village.

III. Results

Results of the questionnaire data calculations can be seen in Table 4. Table 4 showed that the level of usability of e-finance overall was 84.14. Each individual respondent villages provide varying values. The highest ratings given by Bunulrejo and Jatimulyo village is 100. While the lowest score was given by the village Arjosari is 37.50. This is a significant difference on the user experience when using the website e-finance. The difference is caused by education level
Based on the standard questionnaire UMUX there are 4 aspects of assessment to evaluate the usability. The results of each aspect of usability can be seen in Figure 5. The result of the calculation of average scores UMUX of usability evaluation of e-finance website found that aspects of effectiveness have the highest value among other aspects is 94.09. While the convenience aspect get the lowest value is 74.73, but the results of the assessment of the four aspects of usability can be said to be good.

Respondents overall assessment results can be seen in Table 5. The results of the assessment of each aspect is as follows:

a. The measurement values for the aspect of effectiveness is 94.09. This shows that e-finance website very capable of fulfilling the needs of the user.

b. The measurement values for efficiency aspects is 85.48.
This shows that e-finance website is so efficient that it can save time when processing tasks.

c. The measurement values for aspects of satisfaction is 82.26. This indicates that the website is very satisfying e-finance users.

d. The measurement values for aspects of ease of use is 74.73. This shows that e-finance website is easy to use by the user.

IV. DISCUSSION

The author conducted this study to find the level of usability of the e-finance. This is considered important because the website is a financial application Malang city government accurately and real-time which is integrated with all the villages in Malang. We used a standard questionnaire UMUX who presented the three aspects of usability according to ISO 9241-11 (effectiveness, efficiency, and satisfaction) and added 1 aspect ease of use. The items on the questionnaire that represent aspects of effectiveness assessment is one item is “[This system’s] capabilities meet my requirements”. These items can obtain ratings 94.09. So it can be seen that e-finance website has a good level of effectiveness. Item three is “I have to spend too much time correcting things with [this system]” gets ratings 85.48 on the aspects of efficiency. While for the satisfaction and ease of use aspects contained in the questionnaire items three and four, each of which gets ratings is 82.26 and 74.73. The fourth aspect then is averaged to determine the level of usability of e-finance as a whole.

The result of the calculation of the level of usability of e-finance website reaches the value 84.14. It shows that the e-finance website gets a good assessment of the user experience. Although the level of assessment of e-finance as a whole has been good but when viewed from each aspect of the aspect of ease of use scored lower than most other aspects. This means that nearly 25% of users are still not easy or difficulty when using the application. So, in this case, need to know more about what is happening in the problems of e-finance website. Usability testing is one method that can be used to determine what problems that occur within the system. Usability testing methods to measure aspects of the use of the system interface users [15] and related to with this type of usability testing [8] there are five characteristics of usability testing to effectively implement usability testing [11]. Five of these characteristics are (1) the specific purpose of each test, (2) participants representing the use of actual, (3) the participants doing real tasks, (4) researchers observed usability and record what participants do and say, (5) researchers analyzing the data, diagnose problems, and recommend changes.

V. CONCLUSION

The author adopted UMUX standard questionnaire to evaluate the usability of e-finance. UMUX consisted of 4 item Likert scales (1-7) presented the three aspects of usability assessment according to ISO 9241-11 (1998) such as effectiveness, efficiency, satisfaction and added an ease of use (SUS). The results of data analysis showed that the level of usability of e-finance overall was 84.14. The aspects of the effectiveness of getting achieved the highest ratings 94.09. This showed that the ability of e-finance to meet the needs or help the work (tasks) to the application user. The aspects of efficiency and satisfaction ratings received respectively 85.48 and 82.26. This showed that e-finance can help to save time when processing their tasks and to get satisfaction when using this application. But for the aspects of ease of use, as an additional aspect in UMUX received the lowest score among the four aspects was 74.73. From these studies, it was known that almost 25% of users experience difficulty when operating the website e-finance.

For further research, usability problems can be identified in the e-finance application on each aspect (effectiveness, efficiency, satisfaction, and ease of use) especially aspects of ease of use. This is because the aspects of ease of use to get the lowest score. The results of the identification of these problems are used as recommendations for improvement of e-finance application. Additionally, it could also do research to find out whether the application user demographics influence the level of usability.

REFERENCES


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