Empirical Evaluation of User Experience Using Lean Product and Process Development: A Public Institution Case Study in Indonesia

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Abstract. The convenience, speed, accuracy, security are the four main indicators of information quality that are concerning for people to be able access information in a public institution dashboard system. To find out whether the data displayed on the system is easily understood by the users, an empirical evaluation study might be indispensable to be performed. Evaluating user experience is one way to know whether a system is in accordance with user needs or not, whether related to data, interfaces, or system performance. This study assessed user experiences based on the product pyramid and its development process in the case of a public dashboard system in a public institution in Indonesia. The empirical experiment was conducted by 15 participants used a scenario that was deliberately designed and then gave answers to the single ease question (SEQ) and the system usability scale (SUS). The results show that SEQ measurement obtained almost 5.7 amount of score which indicates the application measurement results reach an easy level. The SUS results demonstrated that the system was in the acceptable category with a score around 81.3 Although the findings of the study might not contribute theoretically, it may demonstrate a practical consideration for the stakeholders, in terms of the next system development stage.

INTRODUCTION

Transparency is an important aspect to measure of how ideal governance performance through its government agency [1,2]. In Indonesia, this has been regulated in Law No. 14 the year of 2008 concerning Public Information Openness [3, 4]. This law allows the public to obtain various information about policies and practices regulate by any government agency. Besides the transparable information is one of responsible act as the institution that manages community fund, it is also shows good communication between management and stakeholders [5]. Alongside with current developments in science and technology, the use of ICT as the compulsory implementation is indisputably. In our country, various systems have been developed by government agencies and have "absorbed" a lot of budget. However, performance evaluations of the use of ICTs in this information requirement system tend to be carried out internally within the scope of project implementation. Independent testing related to this matter is rarely done.

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Moreover, the high level of public attention to information access, speed, and accuracy of the data presented are the most important instrument in its presentation [6]. To find out whether the data displayed on the system is easily understood by the recipient of the information, it is necessary to do an evaluation. Therefore, this study is conducted to find out whether a system is following user requirements or not, also the coherency to the data, interfaces and system performance. Evaluation of user experience is one of ways to examine rather user experience is subjective and focus to its product, system, and/or service [7]. In other words, user experience is how it feels for every user when they are dealing directly with the system while using it. An information provider dashboard system in one of the government institutions is a case that is being investigated. The researchers use the lean product process pyramid method [8,9]. To guarantee the research performance, a question is asked in this study about how is the convenience and acceptance levels the system use based on the user experience and perception.

In the following parts, the second part of this paper presents the research methodology points. The third part explains the results and its discussion. Specifically, the third part describes sequentially the results of each evaluation phase and concludes with a discussion of the results based on the prior theoretical basis and research findings is used in this study. Finally, the conclusion part that concludes previous exposures related to research questions, limitations, and recommendations for further similar studies.

METHOD

Procedurally, this evaluation study was carried out within six phases of the iterative process framework of the lean product pyramid [8,9]. Fig. 1 demonstrates the phases. First, the researchers determined the target users of the system. Referring to the Law No. 14 the year of 2008 concerning Public Information Openness, the system was developed to provide information services to the public [3,4]. It was regarding good implementation governance in the public institution. Therefore, the consumers or users of the system were citizen in the country. Second, the scholars identified underserved needs. This phase was conducted by studying literature about the quality constructs of public information. Here, the researchers adopted indicators of the information quality variable (Table 3). Third, the people defined the value proposition of the system by comparing the system with three similar dashboard systems to get a comparison value (Table 4). Fourth, the scholar reformulated features of the system to define the user needs. Here, case diagram was used to design the features (Fig. 2). For the final, the researchers evaluated the system using the user's experiences.

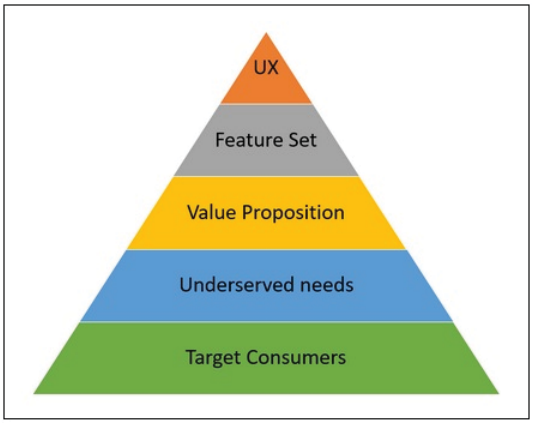

FIGURE 1. The Lean Product Development Pyramid [8, 9]

In detail, the user experience assessment was carried out within three sequential techniques, i.e., structured task scenario, single ease question (SEQ) testing [10,11], and the system usability scale (SUS) [10,12]. SEQs were given to the participants after carrying out the task assigned to see the perception of the usefulness of the system. SEQ consists of a question for each task with seven Likert's scale from very difficult to very easy (Table 1). The SUS test was to find out how high the level of usability and acceptability (acceptable) system design. SUS consists of 10 questions using five Likert's scale from disagree to agree (Table 2). Odd number questions (1, 3, 5, 7, and 9) are positive questions. While even number questions (2, 4, 6, 8, and 10) are negative questions. For this test, this involved five internal users from the internal institution that were the object of research and 10 people who were

randomly selected as the participants. The assessment was based on three categories, namely Not Acceptable with a range of SUS scores 0-50.9, Marginal 51-70.9, and Acceptable 71-100.

TABLE 1. List of Task Scenario and SEQ Assessment

No	Tasks	Assessment							
1	Display data of religious education!	Very Difficult	1	2	3	4	5	6	7	Very Easy
2	Display data of the Madrasah Tsanawiyah!		1	2	3	4	5	6	7	
3	Display statistical data of the Raudhatul Athfal students!		1	2	3	4	5	6	7	
4	Display data of Hajj and Umrah!		1	2	3	4	5	6	7	
5	Display statistical data of Hajj data based on the participant's profession!		1	2	3	4	5	6	7	
6	Display data of the management!		1	2	3	4	5	6	7	
7	Display statistical data on the budget data based on its composition!		1	2	3	4	5	6	7	
8	Display data on Islamic religion!		1	2	3	4	5	6	7	

TABLE 2. List of Usability Questions of SUS Assessment

No	Usability Questions	Assessment						
1	I seem to be using the system often.	Disagree	1	2	3	4	5	Agree
2	I see, there are parts of the system features that are quite troublesome, which should not need to happen.		1	2	3	4	5	
3	I think, the system is easy to use.		1	2	3	4	5	
4	I seem to need the help of a technician to be able to smoothly use the system.		1	2	3	4	5	
5	I think the features of the system are already well integrated.		1	2	3	4	5	
6	I found too many inconsistencies in the system.		1	2	3	4	5	
7	I think people will be able to use the system very quickly.		1	2	3	4	5	
8	I think the system is very difficult to use.		1	2	3	4	5	
9	I feel great using this system.		1	2	3	4	5	
10	I must learn many things first before starting to use the system.		1	2	3	4	5	

RESULT AND DISCUSSION

The Target Users of the System

This phase determined the system market segmentation. The market segmentation of this system are people who need information that can be useful for them as public information that will be obtained in the form of public data. Here, the information is about educational information which manages by the public institution.

The Identified Underserved User Needs

Table 3 presents results of the six identified user needs on the public dashboard system of the sampled institution, around the accuracy, clarity, convenience, understandable, validity, and the updatest issues of information.

TABLE 3. The Identified User Needs

No	The User Needs
1	People need a dashboard system that displays information accurately.
2	People need a dashboard system that displays information.
3	People need a dashboard system that displays information is easy to use.
4	People need that information displayed on a dashboard system is easy to understand.
5	People need that information displayed on a dashboard system is valid to understand valid.
6	People need that information displayed on a dashboard system is always updated.

The Proposed Values

Table 4 shows the score proposition of the system by comparing the system with three similar dashboard systems, i.e., the National Statistics Office of Mongolia and the Philippine Statistic Authority.

TABLE 4. The Value Proposition of the Dashboard System

Comparison Aspects	The sampled system	National Statistics Office of Mongolia	Philippine Statistic Authority
The attraction of the infographics	√	√	√
Easiness of the information understanding	√	√	√
Easiness achievement of the system	√	√	√
The satisfaction of the information display	√	√	√
Attractive interface design	√	√	√
The attraction of the used colour combination	√	√	-
Easiness of the system use	√	√	√
The usefulness of the system for all fields of life	-	-	√
Easiness of the system menus to be operated	√	√	√

TABLE 5. Results of SEQ Assessment

R	Tasks								∑
	1	2	3	4	5	6	7	8	
R1	6	6	6	7	6	7	7	7	
R2	4	4	5	5	5	6	6	7	
R3	5	5	5	5	5	5	5	6	
R4	7	7	7	7	7	7	7	7	
R5	6	5	6	6	7	6	7	6	
R6	4	4	4	4	4	6	6	7	
R7	6	6	6	5	6	6	7	7	
R8	6	5	6	7	6	6	6	7	
R9	4	5	5	7	5	7	7	6	
R10	6	6	6	6	6	6	6	7	
R11	5	5	5	6	6	6	7	7	
R12	7	7	7	7	7	7	7	7	
R13	4	5	6	5	6	7	6	7	
R14	1	2	2	1	2	3	4	4	
R15	4	5	6	6	6	6	7	7	
∑	75	77	82	84	84	91	95	99	
Mean	5	5.1	5.5	5.6	5.6	6.1	6.3	6.6	45.8
∑Total									5.7

TABLE 6. Results of SUS Assessment

R	Questions										∑	∑*2.5
	1	2	3	4	5	6	7	8	9	10		
R1	3	4	2	4	3	3	3	3	2	3	30	75
R2	2	3	3	3	3	5	2	3	3	4	31	77.5
R3	3	3	2	4	3	4	3	3	3	5	33	82.5
R4	3	4	3	3	3	5	2	4	2	5	34	85
R5	3	5	3	3	2	3	2	3	2	4	30	75
R6	2	3	3	5	3	5	2	4	3	5	35	87.5
R7	2	5	3	3	3	5	3	4	3	3	34	85
R8	3	4	3	4	2	5	3	4	3	4	35	87.5
R9	2	5	3	4	2	4	2	5	2	3	32	80
R10	3	4	2	4	3	5	2	4	2	4	33	82.5
R11	2	4	2	4	3	4	3	3	2	3	30	75
R12	3	5	3	5	2	4	2	5	2	5	36	90
R13	2	3	2	3	3	5	3	5	3	4	33	82.5
R14	0	4	2	3	3	5	3	3	2	2	27	67.5
R15	2	5	3	4	3	5	2	4	3	4	35	87.5
∑												1220
Mean												81,3

Feature Set

Fig. 2 demonstrates the feature set of the dashboard system. Here, the researchers conduct a use case diagram for identify the use layer diagram. There are included the five 1st layer features, four 2nd layer features, nine 3rd layer features, four 4th layer features, and around 42 last layer features

Results of the User Experience Assessments

Table 5 presents the results of the SEQ analysis of 15 participants. Meanwhile, Table 6 shows the results of the SUS analysis. From the SEQ and SUS calculations above it can be seen that the system has an SEQ score of 5.7 and a SUS score of 81.3.

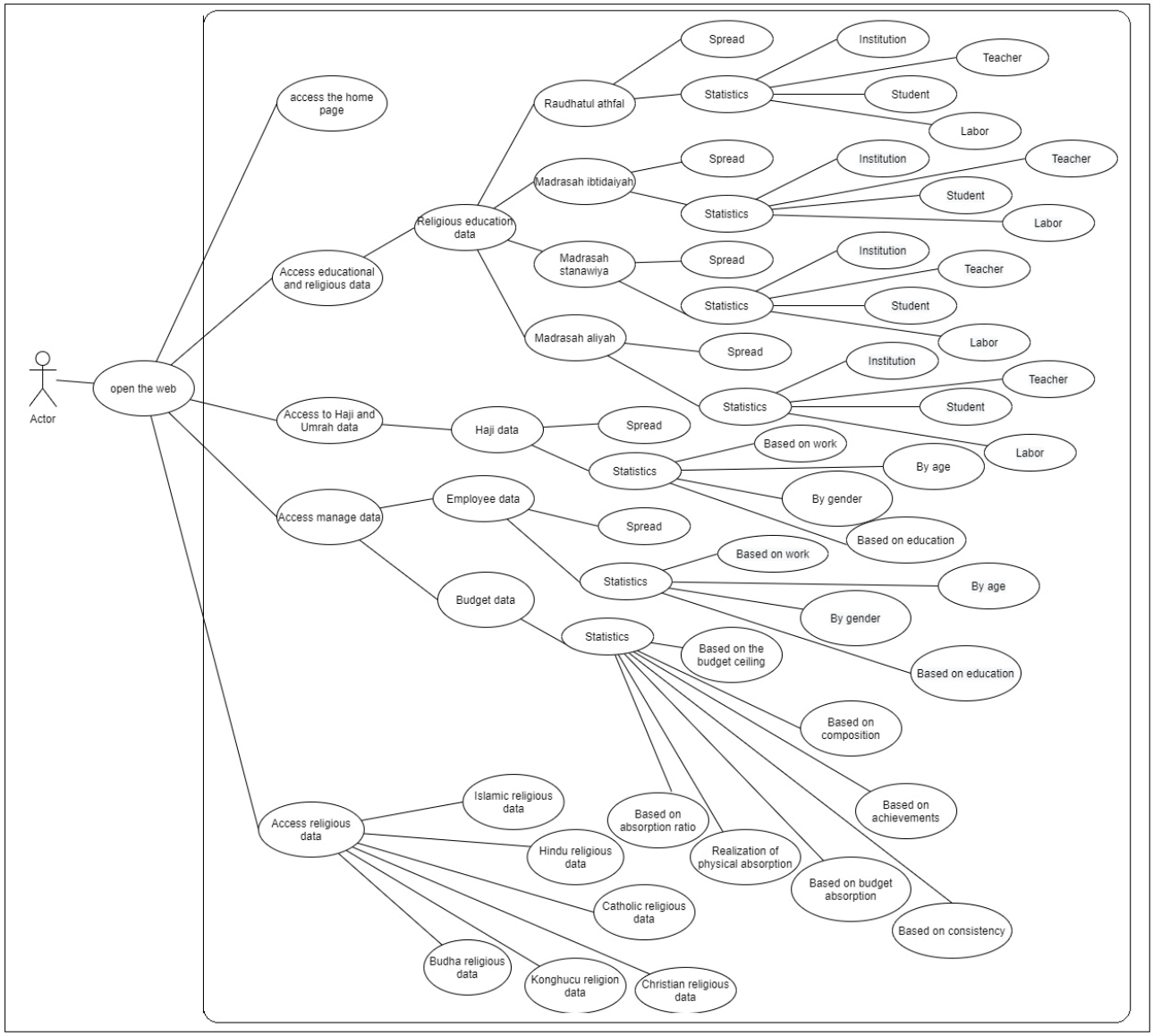

FIGURE 2. Feature Set of the Dashboard System

In short, we can see that results of the SEQ evaluation presented its score around 5.7. Meanwhile, the SUS evaluation expressed the system acceptance value around 81.3 points. Refers to previous user experience studies [10-12], the SEQ analysis results indicate that the system convenient enough to use. Also, the SUS analysis results elucidate that the system can be categorize as an acceptable system.

CONCLUSION

In conclusion, two highlighted points of this user experience evaluation are around the convenience and eligibility aspects of the dashboard system. Both points may have answered the research question of the study. Practically, the findings may help the internal system development team, in terms of the next system development. It is related to the use of the lean product development perspective of the system. Of course, the study may present limitations issues considering the participant involvement, data collection techniques, or the subjectivity of the researchers involved in the study. Thus, the above-mentioned issues may be one of the considerations for the next similar studies.

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