User Experience Analysis on SSO Portal

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Abstract The need for data and information access makes a college build or use an information system to support their operational activities. Users will feel very helpful if the existing system can help their work, taking into aspects of user experience can help in achieving this. The experience of users using the system needs to be studied to determine the level of user satisfaction with the system that has been developed. The main purpose of this study is to assess aspects of user experience in terms of usability. The usefulness of the aspects measured includes effectiveness, efficiency, learning ability and satisfaction. Effectiveness is measured using the first click testing technique and calculating errors during the usability test process. Efficiency is calculated by finding the time needed to complete the task. User measured satisfaction with the system was measured using the SUS questionnaire. SEQ is used to measure the level of difficulty of tasks or scenarios given during the test. Based on the assessment of the respondents, usability aspects of the system have been achieved, but there are additional things that must be addressed related to system design to improve the usability aspect.

Keywords—UX, usability test, first click testing, performance measurement, RTA, SUS, SEQ.

I. INTRODUCTION

The gain of technology has helped in various aspects of life, either in educational environment. Quality improvement in education, especially higher education can be seen from how far the application of technology implementation at the education process.

The application of technology in the field of Education is applied information systems to support service operations. Operational services are academic services and other services in the university or college environment. The need for data and information access makes a college build or use an information system to support their operational activities. Information systems make it easy for them to carry out operational data management. Integrated information system services to support an educational process make it easier for users to access information needed by the users.

IMISSU (Integrated Management Information System, the Strategic of UNUD) is a single sign on portal that provides one-stop access services to all existing systems at Udayana University. Each user had one registered account. Through this singe sign on portal, users can access all available information systems based on user access rights.

Users are divided into three groups of users, namely students, lecturers and employees. Users will feel very helpful if the existing system can help their work, taking into aspects of user experience can help in achieving this.

The problems that often arise in the interaction between humans and computers are often the occurrence of wrong human perceptions (users) of the existing software, so that it is not the effectiveness and efficiency of work obtained, but instead causes inefficient and effective work, users often have difficulty using the software because it is not familiar with software, software is too complicated so it is difficult to learn, software is not in accordance with user needs and does not or does not accommodate important needs for users [1]. Based on these problems, user experience using the system needs to be studied to determine the level of user satisfaction with the system that has been developed.

II. PURPOSE OF PAPER

The main objective of this study was to assess the user experience aspects in terms of usability. Usability aspects measured include effectiveness, efficiency, learnability and satisfaction.

III. LITERATUR REVIEW

A. Usability Criteria

Usability refers to the quality of a user's experience when interacting with products or systems, including websites, software, devices, or applications. Usability is about

effectiveness, efficiency and the overall satisfaction of the user[1].

Various principles need to be followed in order to support usability, making systems easy to learn and easy to use[2]. These principles are:

1) *Learnability*, by which new users can begin effective interaction and achieve maximal performance;

2) *Flexibility,* the multiplicity of ways the user and system exchange information;

3) *Robustness,* the level of support provided to the user in determining successful achievement and assessment of goals;

4) *Efficiency,* once the user learns about the system [the speed with which s/he] can perform the tasks*;*

5) *Memorability,* how easily the user will remember the system functions, after a period time of not using it*;*

6) *Errors,* "How many errors do users make, how severe are these errors, and how easily can they recover from the errors." (Nielsen 2003);

7) *Satisfaction,* how enjoyable and pleasant is it to work with the system.

B. Usability Testing

Usability Testing is an activity that refers to the evaluation of a product or service by testing the product or service to the representative of the user. Usually during the test, participants try to complete certain tasks while the observer watches, listens and makes notes. The aim is to identify Usability problems, collect qualitative and quantitative data, and determine participants' satisfaction with the product*[3].*

C. First Click Usability Testing

First Click Testing examines what a test participant would click on first on the interface in order to complete their intended task. It can be performed on a functioning website, a prototype or a wireframe[4].

The First Click technique is used to measure effectiveness done by finding the correct data of the user's first click[5]. Depend on Jeff Sauro of Measuring Usability cites It states that, a participant who clicks down the right path on the first click will complete their task successfully 87% of the time. Participant who clicks down the wrong-path on the first click, tends to only successfully complete their task 46% of the time[6].

D. Performance Measurement

This technique can be used to obtain quantitative data about the performance of test takers when performing tasks during Usability testing. This technique generally prohibits interactions between participants and evaluators during tests that affect quantitative performance data. Quantitative data is very useful in conducting comparative testing of working time to see efficiency and compare the number of errors to see effectiveness.

E. Retrospective Think Aloud (RTA)

The basic principle of this method is that potential users are asked to complete a set of tasks with the artefact tested, and to constantly verbalise their thoughts while working on

the tasks[8]. RTA is done when the respondent has finished interacting with the system / application object so that the respondent tells what s/he thinks (think aloud) when interacting with system objects / applications.

Evaluators can gather further information by reviewing video recordings together with test takers and giving questions about behavior during testing.

F. System Usability Scale (SUS)

System Usability Scale (SUS) is a Usability testing method of a system in a simple manner with ten scales that provide a comprehensive view of the evaluation of the purpose of use. System Usability Scale (SUS) consists of 10 questionnaire items in the form of a simple Likert scale with respondents required to answer the level of agreement and disagreement on a 5-point scale.

The first step in scoring a SUS is to determine each item's score contribution, which will range from 0 to 4. For positively worded items (odd numbers), the score contribution is the scale position minus 1 ($x_i - 1$). For negatively worded items (even numbers), the score contribution is 5 minus the scale position ($5 - x_i$). To get the overall SUS score, multiply the sum of the item score contributions by 2.5. Thus, overall SUS scores range from 0 to 100 in 2.5-point increments[9]

G. SEQ (Single Ease Question)

SEQ test is used to measure user perceived ease after completing all the given scenarios / tasks[9]. Testing is done in two stages. The first stage is by giving a questionnaire divided into one functional question form. Then the next stage, each question is given a 7 level Likert scale. The task or task scenario to be compiled is to represent the functions contained in the application.

IV. METODE

In the method section explained the steps taken in this study. Figure 1 describes the steps taken.
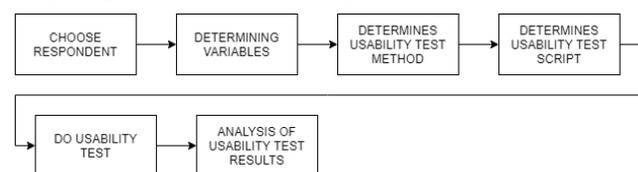

Figure 1 Research Steps In Usability Testing

The steps in Figure 1 will be explained as follows:

1) *Choose the Respondent*

Determine who will be observed during the usability test process, in this case a random sample of employees, lecturers and students is taken.

2) *Determining Variables*

The selection of variables used in research, variables used include effectiveness, error rates, user satisfaction levels and the level of user convenience in using the system.

3) *Determining Usability Test Method*

Selecting a number of techniques from usability testing that match the variables that have been chosen. *First Click Testing* and *Performance Measurement* method are used for measuring effectiveness of system also used for measuring

the level of error. *RTA* is used for getting reason of participant who doesn't complete task. *SUS* is used to measure user satisfaction with the system. SEQ is used to measure the level of difficulty of tasks / scenarios given during the test.

4) *Determining Usability Test Script/Scenario*

Arrange scripts / scenarios that will be carried out by the participant on the usability test.

5) *Do Usability Test*

Conduct observations of participant through a series of assignments given during the usability test. Performance measurement techniques are used for the process of observing the completion of a given task, then proceed with an RTA test to obtain the user's reason for the failure that occurred during the test. The last step is to provide SUS and SEQ questionnaires to obtain quantitative values of satisfaction and convenience for users / respondents.

6) *Analysis of Usability Test Result*

Analyze the data collection obtained after the usability test process is complete.

V. RESULT AND DISCUSSION

First Click testing produces data in the form of success and errors made by participants during the test. RTA produces data in the form of data on the problems or difficulties of participants when carrying out the tasks / scenarios given, and suggestions given by participants during the usability test. SUS and SEQ questionnaires collect quantitative data. Table 1 is an example script or scenario used during the usability test. The script is divided into 3 parts according to the role, namely scripts for lecturers, students and employees.

Table 1 Examples of Testing Scenarios

Code	Instructions
F01	Now you are on the IMISSU home page, then you want to find out the latest news from the system development found at IMISSU
F02	You already know the latest news from development, then you want to know the guidelines for using the system
F03	You return to the IMISSU home page, you will access some of the systems found on IMISSU
F04	Steps are taken if at any time you forget the password combination used to access IMISSU
F05	You have successfully entered the IMISSU dashboard page, you want to make changes to your IMISSU account information.
F06	You go back to the IMISSU dashboard page, when operating the system, an error has occurred and you want to ask something about the system. What do you do if there is an error with one of the systems?
F22	You have explored the IMISSU system along with several related system modules, you can log out of the system.

The results of the First Click testing, if the participant correctly clicks first, gets an effectiveness value of 87%, if the value is wrong 46%[10]. The results of the test data are sought to get the level of effectiveness. The level of effectiveness in terms of students obtained results at 87%, viewed from lecturers by 73% and from employees at 70.6%.

Analysis of participant errors is done to get a comparison of the value of effectiveness. Effectiveness is calculated by looking the average of the tasks that are completed against the total task assigned [10]. Analysis of the effectiveness of participant errors in terms of students obtained 83.33%, lecturers 72.22%, and employees 74.54%. Comparison of the effectiveness values shown in Figure 2.
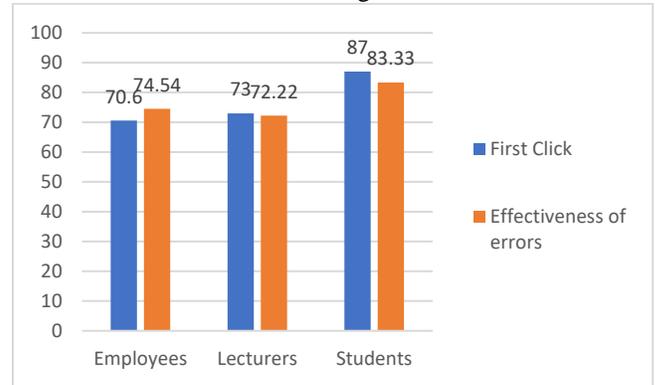

Figure 2 Comparison of the effectiveness

Figure 2 showing the comparison value of effectiveness in terms of students, lecturers and employees. The effectiveness of the system has been achieved.

Efficiency is measured based on the time needed by participants in completing the task. Finding the value of efficiency is done by finding the percentage between the total of time success doing task divided by total time needed[11].
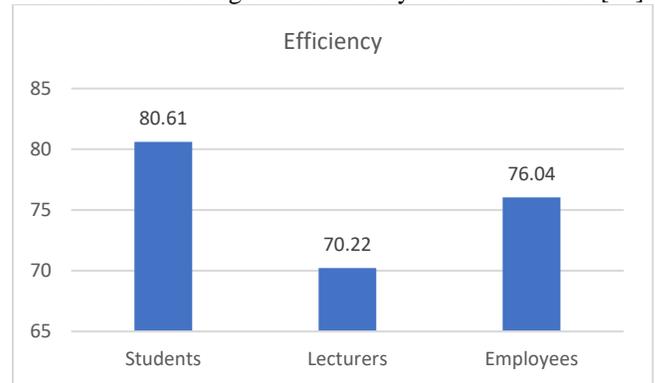

Figure 3 Efficiency Result

The value of efficiency in terms of students obtained a value of 80.61%, viewed from the lecturer obtained a value of 70.22%, in terms of employees obtained a value of 76.03%. Based on these results, the efficiency value has been reached.

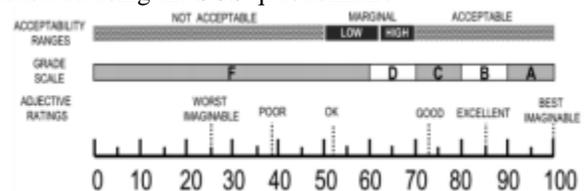The measure of user satisfaction with the system was measured using the SUS questionnaire.

Figure 4 Rating and scale of conversion of average score of SUS[12]

Figure 4 is showing SUS scores above 68 will be considered above the average and anything below 68 is below the average[10] [12].
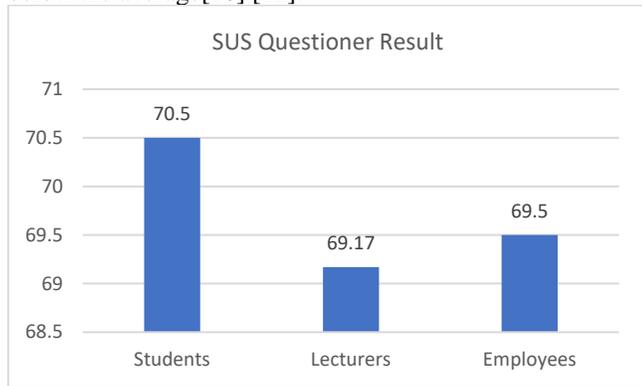
SUS Questioner Result

Figure 5 SUS Questioner Result

Figure 5 showing the results of the SUS questionnaire viewed from students obtained a value of 70.5, viewed from the lecturer obtained a value of 69.17, and viewed from the employee obtained value 69.5, based on rating and scale conversion of average score of SUS, user satisfaction with the system is quite satisfied.

SEQ testing is done by giving an explanation of the system design and the function of its features. During test, the respondent is not allowed to carry out testing outside the prescribed scenario.
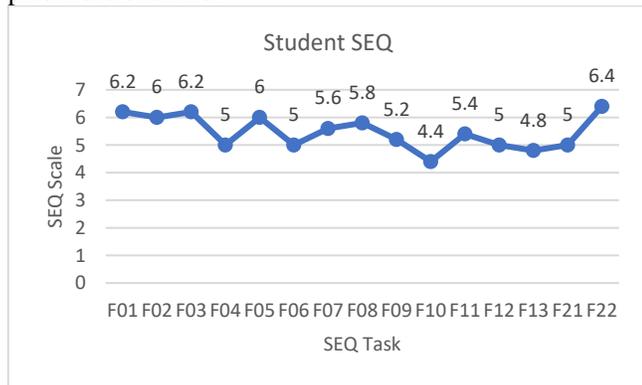
Student SEQ

Figure 6 SEQ Student Result

Figure 6 shows the results of the SEQ questionnaire on the level of difficulty of the task given to students.

SEQ Lecturer Result

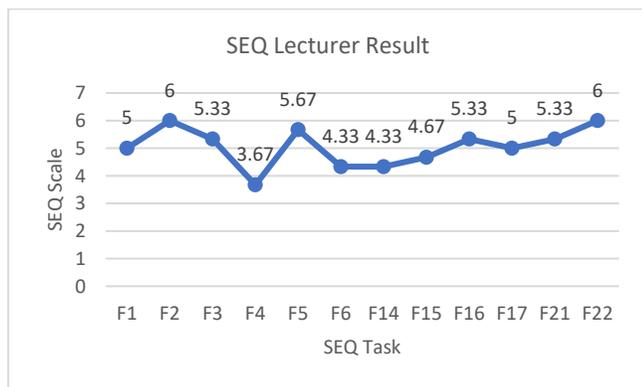Figure 7 SEQ Lecturer Result

Figure 7 shows the results of the SEQ questionnaire on the level of difficulty of the task given to lecturers.
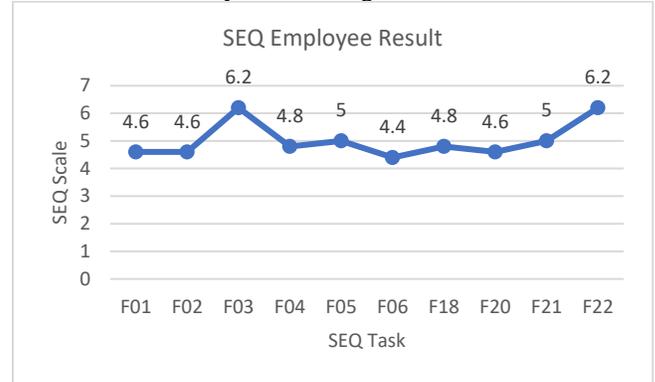
SEQ Employee Result

Figure 8 SEQ Employee Result

Figure 8 shows the results of the SEQ questionnaire on the level of difficulty of the task given to employees.

VI. CONCLUSION

From the implementation of this research conducted can be concluded as follows:

The results of the First Click testing, effectiveness in terms of students obtained results at 87%, viewed from lecturers by 73% and from employees at 70.6%. Analysis of the effectiveness of participant errors in terms of students obtained 83.33%, lecturers 72.22%, and employees 74.54%. The effectiveness of the system has been achieved.

The value of efficiency in terms of students obtained a value of 80.61%, viewed from the lecturer obtained a value of 70.22%, in terms of employees obtained a value of 76.03%. Based on these results, the efficiency value has been reached.

The results of the SUS questionnaire viewed from students obtained a value of 70.5, viewed from the lecturer obtained a value of 69.17, and viewed from the employee obtained value 69.5, based on rating and scale conversion of average score of SUS, user satisfaction with the IMISSU system is quite satisfied.

Based on the assessment of the respondents, usability aspects of the IMISSU have been achieved, but there are additional things that must be addressed related to system design to improve the usability aspect.

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