Usability measurement for *Sistem Proyek Akhir Manajemen Rekayasa Konstruksi* (SIPROK-MRK) measured with the system usability scale

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**Abstract.** During the corona virus pandemic, the thesis examination in the Construction Engineering Management study program was conducted online. This is in accordance with the rules of the director at State polytechnic of Malang. Based on this background, a thesis examination system was developed to enable the tests to be conducted online. The main features of this application are the guidance assessment, exam evaluation and revision can be done online. To evaluate the system that has been developed, the usability level of the application is measured using the System Usability Scale. System usability scale is a technique used to measure usability score, system quality, the information presented and the system interface. Based on the questionnaire filled by user the usability score of SIPROK-MRK was 0.82.

1. Introduction

The Covid-19 pandemic has a very wide impact throughout Indonesia, in the fields of economy, tourism, and education [1]. One of the effects of covid-19 in the education sector is that the learning process is required to take place online, to prevent the spread of the corona virus [2]. The online teaching and learning process is also implemented by the State Polytechnic of Malang, where theoretical and practical lecture activities, final assignment guidance, and final assignment examinations are carried out online, without face to face meeting. In order to simplify the systematics of the final assignment examinations for students, a system is needed to be able to assist the series of the final project examination process. Construction Engineering Management which is one of the study programs in the Department of Civil Engineering, State Polytechnic of Malang, began to develop an information system to assist the implementation of online final exams, which is named *Sistem Proyek Akhir Manajemen Rekayasa Konstruksi* (SIPROK-MRK).

Currently there are three parties that can use SIPROK-MRK, there are the final project examination committee, lecturers, and students. Through SIPROK-MRK, the committee can arrange exam schedules and manage data, such as lecturer and student guidance data. Lecturers can see the exam schedule and give grades to the students they supervised and the students they tested. Meanwhile, students can see the exam schedule and download the revised list provided by the examining lecturer. SIPROK-MRK has been implemented and used for the final oral examination in the even semester of the 2019/2020 school year which consists of 5 stages. To find out whether this information system...
really facilitates the online exam process, as well as to find out the level of its usefulness for the organizing committee, lecturers, and students, a method of calculating the level of usefulness of this system is needed. Therefore, a measurement of the usability level of SIPROKMRK was carried out using the System Usability Scale.

Measurements are carried out on four components, there are the usability of the entire system, the quality of information system, the quality of information conveyed to users, and the interface quality of this information system [3]. Usability ratings measurement of this information system is useful as an evaluation material in the process of further system development, and of course to determine the usefulness of this information system [4].

2. Background Study

2.1. System Usability Scale (SUS)

This research uses SUS with the Post-Study System Usability Questionnaires (PSSUQ) questionnaire model [5]. The System Usability Scale (SUS) provides a “quick and dirty”, reliable tool for measuring the usability [6,7]. PSSUQ consists of a 16 items question with 7 response options for respondents; from Strongly disagree to Strongly agree. The list of question is as follow [8].

Table 1. PSSUQ with 16 items question.

| 1. Overall, I am satisfied with how easy it is to use this system. |
|-----------------------------------------------|
| 2. It was simple to use this system.           |
| 3. I was able to complete the tasks and scenarios quickly using this system. |
| 4. I felt comfortable using this system.      |
| 5. It was easy to learn to use this system.   |
| 6. I believe I could become productive quickly using this system. |
| 7. The system gave error messages that clearly told me how to fix problems. |
| 8. Whenever I made a mistake using the system, I could recover easily and quickly. |
| 9. The information (such as online help, on-screen messages, and other documentation) provided with this system was clear. |
| 10. It was easy to find the information I needed. |
| 11. The information was effective in helping me complete the tasks and scenarios. |
| 12. The organization of information on the system screens was clear. |
| 13. The interface of this system was pleasant. |
| 14. I liked using the interface of this system. |
| 15. This system has all the functions and capabilities I expect it to have. |
| 16. Overall, I am satisfied with this system.  |

The formula to calculate the score of SUS is as follow:

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Score = \frac{\text{total score of respondent}}{\text{maximum score}} \quad (1)
\]

3. Research methodology

This research uses the prototype method, because the software development time is short, which is 1 month [9]. So that by using prototype, the software development team can receive input from users quickly in an adaptive manner so that it can be changed according to user needs. The prototype model stage can be seen on Figure 1, user can evaluate the software and give suggestion for the development team as many as possible [10].
Figure 1. Prototype model stage.

3.1. Information system development
SIPROK-MRK is a web-based information system developed using the Laravel framework and MySQL database. There are several main features that can be accessed by lecturers, students, and final project examination committee, there are:

- Schedule page, which contains a list of the final oral exam schedule. The information displayed is student’s name, the final project title, the exam room, the academic year, the date and time of the exam, and the examiner’s name. This page can be accessed by lecturers, students, and the organizing committee.
- Revision page, which contains revision notes provided by examiners. Revision notes are provided in PDF format and can be downloaded by students. This page can be accessed by lecturers, students, and the organizing committee.
- The assessment page, which is used by the lecturer to provide an assessment of the students he supervises, the students being tested, and to provide revisions to the students being tested. This page can be accessed by lecturers.
- Admin page, which is used to manage all data. This page can be accessed by the admin and the organizing committee.

4. Results and discussion
4.1. Implementation of SIPROK-MRK
Some examples of the interface from SIPROK-MRK can be seen in Figure 2.
Figure 2. Examples of the interface in SIPROK-MRK.

The main page of SIPROK-MRK is the exam schedule page as can be seen in Figure 2 (a), where this page can be accessed by students and lecturers. On this page, users can filter by academic year, exam stage, and search based on desired keywords. On the revision page (Figure 2 (b)), students can download and print Form U4 (Figure 2 (e)) which is a revision note given by three examiners. On the
assessment page, there are two types of assessments, assessments for guidance students (Figure 2(c)) and assessments for students being tested (Figure 2(d)). This assessment page can only be accessed by lecturers by first logging in using the employee identification number. While the U2 form in Figure 2(e) is an examination report containing the scores of the three examiners, this form can only be obtained by the first examiner.

4.2. Usability measurement of information system

The questionnaire for SIPROK-MRK can be accessed publicly by opening the questionnaire menu on the SIPROK-MRK page. The questionnaire consists of 16 questions that are used to measure the usability of the system that has been developed. And there are additional questions as system development suggestion for the next semester. Based on the recapitulation of the questionnaire, there were 47 users who filled out the SIPROK-MRK, consisting of 34 students and 13 lecturers. The questionnaire is used to measure 4 things, such as:

- Overall usability score was 0.82 which obtained from the recapitulation of questions 1-16
- Quality System (SysQual) score was 0.86 which obtained from the recapitulation of questions 1-6
- Information Quality (InfoQual) score was 0.80 which obtained from the recapitulation of questions 7-12
- Interface Quality (IntQual) score was 0.77 which obtained from the recapitulation of questions 13-15

Based on the result of the usability measurement interface quality should give more attention because the score lowest compare to other scores. Based on the analysis, this can be caused because the interface that displays the table has to be scrolled horizontally to be able to see information on all its columns.

5. Conclusion

Sistem Proyek Akhir Manajemen Rekayasa Konstruksi (SIPROK-MRK) has been used to carry out the thesis examination in the Civil Engineering Department, State Polytechnic of Malang. Based on the questionnaire results of the overall usability score was good with the results of 0.82. However, there are many suggestions that can be used to improve SIPROK-MRK so that it can increase the usability score. Especially on the quality of the interface which should be improve immediately so the users fell comfort when using SIPROK-MRK.

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