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# User experience measurement to SPADA DIKTI using system usability scale

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## Abstract

In the digital era, one of the challenges in the world of education is the development of online learning media. Currently, the Ministry of Research, Technology and Higher Education has launched a learning media that can be used by all lecturers at universities throughout Indonesia as a solution for an LMS that can be integrated by all universities in Indonesia, but not all universities want to use the SPADA DIKTI. There are still many universities that persist with self- developed LMS. So that currently the use of SPADA DIKTI is not maximized. This makes SPADA DIKTI an interesting topic to be used as a research topic. An important issue that needs to be considered is the user experience. In this study, we will examine how the user's user experience is by combining the user experience measurement method, namely the System Usability Scale, combined with one of the data mining methods, namely the Association rule. Combining the two methods will produce a pattern for suggestions for future SPADA DIKTI developers. In the process of testing user experience at SPADA DIKTI using the SUS method, it shows a value of 64.53. The results of the SUS Score have the adjective OK, Acceptable Marginal, and NPS are Detractors. So SPADA DIKTI in terms of user experience still has a low value so it needs to be im-proved in terms of usability.

## Keywords

User experience, SPADA DIKTI, System usability scale

## Introduction

One of the demands in the world of education today is the implementation of a distance learning process. Information technology accelerates the realization of the distance learning process. One of the media that supports this is the Learning Management System (LMS) [1]. The learning process using LMS can help the learning process starting from attendance, monitoring learning, assignments and evaluating student grades. Almost all educational institutions are competing to create LMS [2][3].

The Directorate General of Learning and Student Affairs of the Ministry of Research, Technology and Higher Education has launched an LMS for tertiary institutions, namely

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SPADA DIKTI. SPADA DIKTI is a form of LMS which aims to increase equal access to quality learning in all tertiary institutions in Indonesia. Students can access lectures from other universities that are integrated by SPADA DIKTI and their learning outcomes can be recognized by the university where the student studies.

One of the determinants of the success of an LMS system is the user experience. The higher the acceptance of the user experience of an LMS system, the higher the level of success of an application in achieving its goals.

SPADA DIKTI will be accessed by all students and lecturers in Indonesia. Various government programs leading to Independent Learning Campus (MBKM) require students and lecturers to use SPADA DIKTI. So SPADA DIKTI will continue to develop products, services and features as LMS media. As more products, services and features are developed for users, SPADA DIKTI will provide new challenges and opportunities for user experience measurement on a larger scale [4]. With the basic user experience, SPADA DIKTI will be more interactive. To improve the quality of the SPADA DIKTI LMS, a user experience evaluation needs to be carried out. From the results of this evaluation, recommendations can be used to improve a system in the future.

Users are an important factor in the success of an application as well as an LMS. No matter how sophisticated the features an application offers, it cannot be said to be successful if the application cannot be accepted by users [5][6]. The more users who feel satisfied when using the application, the higher the chance of success for the system being developed. A good LMS can accommodate user needs and create a high level of user satisfaction.

There are still many students and lecturers from various campuses in Indonesia who have not used or even known about SPADA DIKTI. In fact, some schools or campuses prefer to use LMS that they develop themselves. In fact, with the existence of SPADA DIKTI, each university level agency does not need to have its own LMS. Higher education institutions that already have an LMS can also be integrated with SPADA DIKTI.

To find out how high the level of user satisfaction and needs is, a measurement is needed. Much research in the field of Human Computer Interaction (HCI) discusses the importance of measuring user satisfaction in a digital product. Because measuring user satisfaction can be used to increase the success of digital businesses. Digital business is very dependent on the number of users. The more users there are, the business revenue will also increase. LMS is a digital product whose business model is not much different from other digital businesses such as e- commerce and other online applications. Apart from that, measuring user experience can be divided into three dimensions, namely Usefulness, Satisfaction (satisfaction), and Ease of Use (ease of use) [7].

Several platforms from digital companies such as Tokopedia, Google, Shope, YouTube have succeeded in creating a good user experience that has supported their business journey so that it is as big as it is now. User experience is an important consideration in every feature and product development. Feedback from users is analyzed to get new

opportunities that did not exist before. When developing an application, testing can be done through prototyping testing before carrying out further development [8]. This can be more effective in terms of time and cost.

There are many methods to measure user experience such as user satisfaction level, eye tracking, usability testing, A/B testing and many more. To measure user satisfaction such as: The HEART Framework, NET Promote Score (NPS), System Usability Scale (SUS). The existing methods can also be used to measure the needs and satisfaction of SPADA DIKTI users [4]. Testing is needed to find out how satisfied users are. One method of user observation is eye tracking [9]. System Usability Scale (SUS) to measure the level of usefulness perceived by users. This score can indicate the usability performance of effectiveness, efficiency, and ease of use [10].

From the test results data, this research can also identify user experience associations. By exploring and recognizing patterns from this data. The data mining method that can be applied is association rules, with association rules we can recognize user habits in using an application [11]. This is important to improve the user experience when using the SPADA DIKTI system.

This usability study will discuss user experiences in learning and using SAPADA Indonesia. In this research, we will carry out several tests that refer to the indicators contained in usability. These indicators are used to measure how satisfied users are in using SPADA DIKTI to achieve the success and goals of the application [12].

Both studies were tested using different techniques and instruments, namely the system usability scale. So, when compared with the research conducted, there are differences in how to carry out usability testing. Where the research process is carried out with five variables consisting of usability, learnability, satisfaction, efficiency, memorability and error [13][14]. Usability is a measure of system quality to assess how users can easily recognize the user interface used. The assessment is based on user experience when using the system [15][16].

## Method

This section will show the stages carried out in the research to measure the usability of SPADA DIKTI. This research measures the level of usability at SPADA DIKTI using the System Usability Scale method. The SUS method consists of several stages. The results obtained from SUS are in the form of a score which will show how high the level of user acceptance of the SPADA DIKTI application is. In general, the stages consist of 4 parts. The initial stage starts from designing a usability measuring tool. After that, continue with carrying out testing. After the test is carried out, the data is processed and analyzed. The final stage is to present the test results. The stages carried out in this research can be seen in Figure 1.

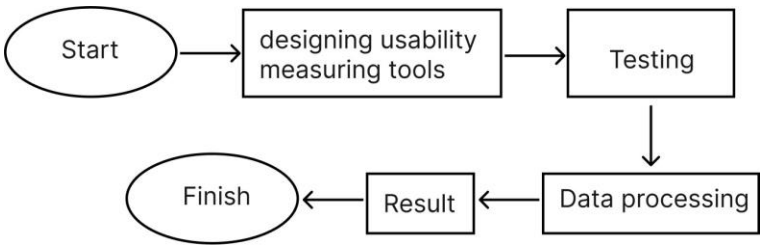


Figure 1. Research Stages

## *System Usability Scale*

The first stage is preparing questions. The questions on the SUS consist of 10 questions regarding usability in using SPADA DIKTI. Each question created is given a code Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9 and Q10. The questions in this research can be seen in Table 1.

Table 1. Question list

| No. | Code | Question |
|---|---|---|
| 1. | Q1 | I thought I would use SPADA DIKTI to help the teaching and learning process for students. |
| 2. | Q2 | I feel that SPADA DIKTI is more complicated than the LMS at my university |
| 3. | Q3 | I feel that SPADA DIKTI is easy to learn |
| 4. | Q4 | I need help from other people to add lecture material to SPADA DIKTI |
| 5. | Q5 | I feel that the SPADA DIKTI features work well |
| 6. | Q6 | I find it difficult to assess student assignments at SPADA DIKTI |
| 7. | Q7 | I feel students will quickly understand how to use SPADA DIKTI |
| 8. | Q8 | I feel that students have objections when learning through SPADA DIKTI |
| 9. | Q9 | I feel there are no obstacles in using SPADA DIKTI |
| 10. | Q10 | I need to learn a lot to operate SPADA DIKTI optimally |

In the SUS for each question there are 5 grade grades that have been determined [17]. The data obtained from the questionnaire is qualitative and then converted into quantitative data. Each question has an answer scale of 1 to 5. If the respondent answers 1 it means Strongly disagree, if 2 means disagree, if 3 means doubtful, if 4 means agree and if 5 means strongly agree. The answer scale on the SUS can be seen in Table 2.

Table 2. Answer scale

| No. | Scale | Answer Value |
|---|---|---|
| 1. | 5 | Strongly Agree |
| 2. | 4 | Agree |
| 3. | 3 | Hesitative |
| 4. | 2 | Disagree |
| 5. | 1 | Strongly Disagree |

After creating the questionnaire questions on the SUS, it was continued with distributing the questionnaire. This questionnaire was distributed by taking a minimum sample of 30 respondents from lecturers who had used SPADA DIKTI from various universities in Indonesia. Distribution of questionnaires was carried out using private messages.

## *Data processing and analysis*

After the questionnaire results are obtained, the next step is to change the qualitative data to quantitative according to the answer scale in Table 2. After that, each

respondent will have their SUS score calculated. The SUS score is calculated by dividing 2 types of questions, namely odd questions and even questions. Odd questions are found in Q1, Q3, Q5, Q7, Q9. Even questions with Q2, Q4, Q6, Q8, Q10. After that, it is calculated using the SUS Score formula which can be seen in Figure 2.

$$\text{SUS Score} = ((Q1+1) + (Q3+1) + (Q5+1) + (Q7+1) + (Q9+1) + (5 - Q2) + (5 - Q4) + (5 - Q6) + (5 - Q8) + (5 - Q10)) \times 2{,}5$$

Figure 2. Formula SUS Score

After the results are obtained, the test results will be entered according to the SUS parameters. By calculating odd questions, the value is – 1 and for even questions it is 5 – marks [18]. This formula can be seen in Table 3.

Table 3. SUS Grade

| No. | Grade | SUS | Percentile Range |
|---|---|---|---|
| 1. | A+ | 84.1 – 100 | 96 – 100 |
| 2. | A | 80.8 – 84.0 | 90 – 95 |
| 3. | A- | 78.9 – 80.7 | 85 – 89 |
| 4. | B+ | 77.2 – 78.8 | 80 – 84 |
| 5. | B | 74.1 – 77.1 | 70 – 79 |
| 6. | B- | 72.6 – 74.0 | 65 – 69 |
| 7. | C+ | 71.1 – 72.5 | 60 – 64 |
| 8. | C | 65.0 – 71.0 | 41 – 49 |
| 9. | C- | 62.7 – 64.9 | 35 – 40 |
| 10. | D | 51.7 – 62.6 | 15 – 34 |
| 11 | F | 0 – 51.6 | 0 – 14 |

## Results and Discussion

In research conducted by Khalid Omar in 2018 in the LMS case at King Abdul Aziz University [2], he succeeded in carrying out calculations with SUS as a basis for evaluating user display developers. Thus, our research results support previous findings regarding the usefulness and reliability of SUS as a usability evaluation tool. However, we are trying to implement it in SPADA DIKTI LMS.

This research aims to find out how high the level of satisfaction and needs of SPADA DIKTI LMS users is. To find out how high the level of user satisfaction and needs is, a measurement is needed. Much research in the field of Human Computer Interaction (HCI) discusses the importance of measuring user satisfaction in a digital product. Because measuring user satisfaction can be used to increase the success of digital businesses.

In this research, questionnaires have been distributed to lecturers and students to find out the level of user satisfaction of the SPADA DIKTI LMS. This questionnaire was distributed by taking samples of lecturers and students who had participated in the 2021 Independent Student Exchange Program from all universities taken randomly, because the activities in this program were assisted by the SPADA DIKTI LMS. The questionnaire received 32 respondents. The results of the 32 respondents can be seen in Table 4.

Table 4. Result respondence

| RESPONDENT | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 R1 | 3 | 4 | 2 | 2 | 4 | 2 | 2 | 4 | 2 | 4 |
| 2 R2 | 5 | 3 | 4 | 2 | 4 | 3 | 3 | 2 | 4 | 4 |
| 3 R3 | 4 | 2 | 4 | 4 | 4 | 2 | 4 | 2 | 3 | 4 |
| 4 R4 | 1 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 4 |
| 5 R5 | 2 | 5 | 2 | 5 | 2 | 5 | 3 | 4 | 2 | 4 |
| 6 R6 | 5 | 4 | 4 | 4 | 4 | 2 | 4 | 2 | 5 | 4 |
| 7 R7 | 2 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 4 |
| 8 R8 | 3 | 2 | 4 | 2 | 4 | 2 | 3 | 3 | 4 | 2 |
| 9 R9 | 4 | 2 | 4 | 2 | 4 | 4 | 4 | 4 | 4 | 2 |
| 10 R10 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 4 |
| 11 R11 | 5 | 2 | 4 | 1 | 4 | 2 | 3 | 1 | 4 | 2 |
| 12 R12 | 2 | 3 | 4 | 2 | 4 | 2 | 3 | 3 | 3 | 4 |
| 13 R13 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 |
| 14 R14 | 4 | 2 | 4 | 2 | 2 | 2 | 3 | 2 | 2 | 4 |
| 15 R15 | 1 | 4 | 3 | 3 | 4 | 3 | 2 | 3 | 3 | 4 |
| 16 R16 | 5 | 2 | 5 | 3 | 4 | 2 | 5 | 2 | 4 | 3 |
| 17 R17 | 4 | 4 | 4 | 2 | 3 | 2 | 3 | 3 | 3 | 2 |
| 18 R18 | 5 | 2 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 4 |
| 19 R19 | 4 | 2 | 4 | 1 | 4 | 3 | 4 | 2 | 4 | 4 |
| 20 R20 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 |
| 21 R21 | 5 | 2 | 5 | 2 | 4 | 2 | 5 | 2 | 4 | 2 |
| 22 R22 | 3 | 2 | 4 | 2 | 4 | 3 | 4 | 3 | 3 | 4 |
| 23 R23 | 4 | 3 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 4 |
| 24 R24 | 4 | 3 | 4 | 2 | 4 | 3 | 4 | 2 | 3 | 4 |
| 25 R25 | 4 | 2 | 5 | 1 | 4 | 2 | 4 | 2 | 4 | 2 |
| 26 R26 | 4 | 2 | 4 | 2 | 3 | 2 | 3 | 2 | 2 | 2 |
| 27 R27 | 4 | 3 | 4 | 2 | 3 | 2 | 4 | 2 | 2 | 4 |
| 28 R28 | 5 | 2 | 5 | 1 | 5 | 1 | 4 | 2 | 5 | 2 |
| 29 R29 | 4 | 2 | 4 | 2 | 4 | 3 | 4 | 2 | 4 | 4 |
| 30 R30 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 31 R31 | 5 | 3 | 4 | 3 | 4 | 2 | 3 | 2 | 2 | 3 |
| 32 R32 | 5 | 4 | 5 | 1 | 2 | 4 | 3 | 2 | 4 | 2 |

After getting the data, each respondent's SUS Scores are calculated. In the data obtained, the highest SUS score is 36 which is found in R28. Then the smallest SUS score is 8, located on R5. Apart from each respondent, for each question the average SUS Score is also calculated. The value obtained is Q1 with 3.78, Q2 with 2.63, Q2 with 2.63, Q3 with 4.03, Q4 with 2.25, Q5 with 3.78, Q6 with 2.44, Q7 with 3.66, Q8 with 2.38, Q9 with 3.50 and Q10 with 3.23. It can be seen that the highest SUS Score is with question Q3. Then the lowest score is question Q4. We can see a graph of the results of calculating the average SUS score in Figure 3.

After transforming the data from qualitative into quantitative form, the SUS is calculated. By grouping 10 questions into odd and even. The odd questions are Q1, Q3, Q5, Q7 and Q9 and the even questions are Q2, Q4, Q6, Q8 and Q10. For odd questions, calculations are carried out by adding up all the results (value - 1). Then for even data a calculation is carried out by adding all the results with (5 - Value).

Then the questionnaire results can be calculated using the SUS Score method. The total score for the even questions is. The results of the calculation can be seen in Table 5. The calculation using SUS produces a score of 64.53. If applied to a table, it can be seen

in Table 5. The complete SUS assessment scale shows the range of SUS scores for each level and the corresponding percentile range of the scores obtained based on [17][10]. Can be seen in Figure 4.

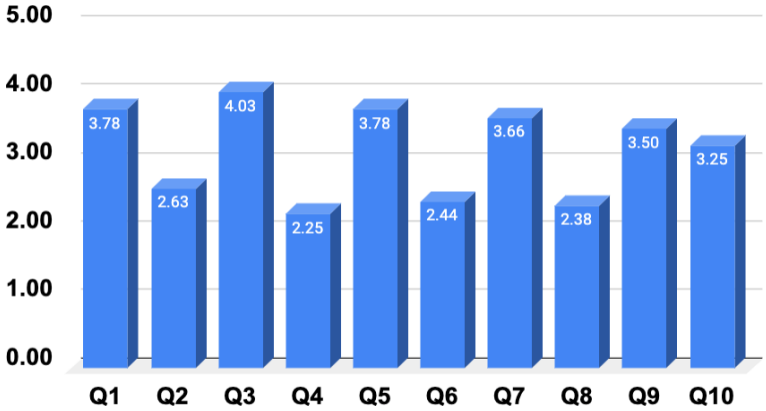


Figure 3. Main of question

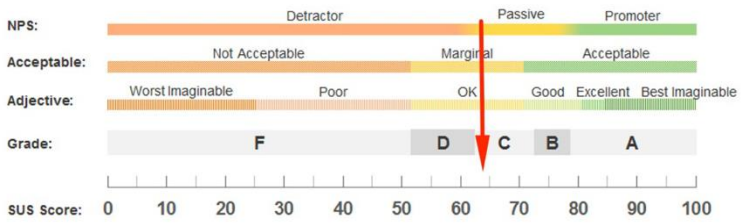


Figure 4. Result of SUS

So, from the results of the SUS calculation at SPADA DIKTI, Grade C- was obtained with a score between 6.50 – 7.50, the Adjective was OK, the Acceptable result was Marginal, and the NPS assessment was in the Passive group as in Table 5. With this value, it is known that there is still a need to increase the user satisfaction value of the SPADA DIKTI LMS. With the results of the SUS method, it is necessary to compare the Hybrid SUS method or what is called H- SUS. H-SUS is a development of the SUS method by combining pictorial and verbal information on the same scale.

Table 5. Result

| Grade | SUS | Percentile range | Adjective | Acceptable | NPS |
|---|---|---|---|---|---|
| C- | 6,50 – 7,50 | 15 – 34 | OK | Marginal | Passive |

## Conclusion

This research has tested the user experience on SPADA DIKTI. Based on this research, the user experience testing process at SPADA DIKTI using the SUS method showed a value of 64.53. The SUS Score results have the adjective OK, Acceptable Marginal and NPS is a Detractor. So SPADA DIKTI in terms of user experience still has a low value so it needs to be improved in terms of usability. So, these results need to be of concern to university management. If it is related to the definition of the usability aspect and if seen from the commercial aspect, of course it will not be a problem, but because this service is used as a learning medium, the quality of this online learning media service must be

of particular concern because it concerns the level of success and satisfaction of SPADA DIKTI users.

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