Usability study of moodle LMS in statistics Indonesia learning center - case study

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Abstract. Statistics Indonesia Learning Center (Pusdiklat BPS) mainly focuses on education and training for Statistics Indonesia's employees and also for employees of other agencies. In the agency, there is an e-learning system to support distance learning. In the current system, the environment is not very optimal because the process of conducting learning and examinations is separated on two different platforms. It also needs another function like adding new features to give better assistance for administrators and training participants. In this paper we try to apply the Moodle Learning Management System (LMS) and customize it according to the requirement, to address the problems of the current e-learning system. From the evaluations, it was concluded that the new system was functioning well. It was acceptable to the users and it could meet user needs in terms of user interface and speed of response or execution time. Moodle LMS can be recommended as a good e-learning platform in the agency.

1. Introduction
The rise of ICT infrastructure and the internet changes many aspects of our life, including how we study and learn. The conventional face-to-face teaching and learning activities now can be complemented or even substituted by e-learning. E-learning facilitates knowledge acquisition and distribution through electronic means. E-learning is managed by a Learning Management System (LMS). LMS is a powerful software system developed to enhance the learning process [1]. LMS allows students to view lectures in multimedia format, communicate with the lecturers, upload assignments, do quizz, and so on.

Currently, Moodle is among the most popular, free, open-source, LMS available for educational institutions. According to Capterra, Moodle is the most popular [2], followed by Edmodo and Blackboard. Moodle is an abbreviation of the Modular Object-Oriented Dynamic Learning Environment. Moodle supports some learning activities like online assignment, chat, forum, quiz, and survey [3]. Adoption of Moodle LMS was shown on the official website [4] with over 104 thousand instances in 231 countries. With over 20 million courses and over 173 million users, Moodle is still one of the most popular LMS. These figures only include the officially registered instances. The statistics are shown in figure 1.

2. Application Moodle LMS
Statistics Indonesia Learning Center (Pusdiklat) is a unit of Statistics Indonesia Agency that focuses on education and training for employees from within and also from other agencies. E-learning system in Pusdiklat is used to complement the conventional teaching and learning system. According to the measurement result of e-learning system readiness [5], Pusdiklat BPS is on level 3rd which means that
generally, the organization is ready to facilitate e-learning but it still needs organization governance, human resources, funds, technology, and learning content to fully support e-learning.

![Moodle Statistics](image)

**Figure 1.** Moodle Statistics [4]

The initial e-learning system used by Pusdiklat BPS used two different platforms for learning and evaluation. The usage of two different platforms introduced some problems such as lack of integration in the database and the students need to understand operating both platforms [5]. In the requirement document, there is a need to optimize the e-learning system in Pusdiklat by merging the e-learning system in a single platform. We choose to apply moodle LMS and customize it according to our needs. Figure 2 shows the application and customization of Moodle LMS in Pusdiklat.

![Moodle LMS in Pusdiklat BPS](image)

**Figure 2.** Adoption of Moodle LMS in Pusdiklat BPS

After the installation and customization process, there is a need to evaluate the usability of Moodle LMS in the agency. The term “usability” generally means effectiveness, efficiency, and satisfaction of a system [6] and many studies have been done to evaluate Moodle LMS usability. Some compare them with other LMS [7,8,12,13] and some study the features usability [1,10,11]. In this study we evaluate the usability of LMS moodle as the e-learning platform in the agency.

### 3. Evaluation Procedure

To evaluate the usability of applied Moodle LMS, we used 2 questionnaires namely System Usability Scale (SUS) and User Interface (UI) questionnaire. SUS is the most reliable and easy to use compared...
to other types of usability questionnaires like Computer System Usability Questionnaire, Microsoft’s Product Reaction Cards, etc [6]. The respondents were the administrators and users of Moodle LMS.

3.1. SUS
SUS is a Likert Scale that includes 10 questions that need to be answered by users [9]. Respondents will rank each question from 1 to 5 based on how much they agree with the statement. 5 means completely agree, 1 means completely disagree. The questions are as follows: (1) I think that I would like to use this system frequently; (2) I found the system unnecessarily complex; (3) I thought the system was easy to use; (4) I think that I would need the support of a technical person to be able to use this system; (5) I found the various functions in this system were well integrated; (6) I thought there was too much inconsistency in this system; (7) I would imagine that most people would learn to use this system very quickly; (8) I found the system very cumbersome to use; (9) I felt very confident using the system; (10) I needed to learn a lot of things before I could get going with this system.

Then the SUS score will be computed as follow: (1) For each of odd-numbered questions, subtract 1 from the score; (2) For each of even-numbered questions, subtract their value from 5; (3) Take these new values which you have found, and add up the total score. Then multiply this by 2.5. Overview of final score: (1) 80.3 or higher is very good; (2) 68 to 80.3 is decent; (3) 51 or under is bad.

3.2. Questionnaire for User Interface (UI)
We also evaluate the user’s perception of the user interface. This test also uses a Likert scale (very bad, bad, medium, good, and very good) with the following statement:
1. The combination of colors
2. Clarity of writing
3. Usage of words/terms
4. Page layout
5. Consistency of display
6. Corresponding information displayed
7. Completeness of functions or features
8. Message clarity if it fails or successful
9. Application response or execution speed
10. The user's learning speed with the application

The score will be computed as follow: we give 1 score for very bad, 2 for bad, and so on until 5 for the very good and then multiply each score by 2 and add up to total score. The overview of the final score is very good if the score is more than 70.

4. Evaluation Result

4.1. SUS result
Table 1 and figure 3 show the computed result of the SUS score from the questionnaire. The minimum score is 70 and the maximum score is 90 with an average of 79. It means that the system can be accepted by the users.

| Respondent # | Question Score | Total Score |
|--------------|----------------|-------------|
|              | 1 2 3 4 5 6 7 8 9 10 |             |
| 1            | 3 1 3 3 3 3 3 3 3 3 | 70          |
| 2            | 4 3 4 3 3 4 4 4 3 3  | 87.5        |
| 3            | 3 2 3 2 3 3 3 3 3 3  | 70          |
| 4            | 3 3 4 3 3 3 3 3 4 2 3| 77.5        |
| 5            | 4 4 3 4 3 4 4 4 2 4  | 90          |

**Table 1. SUS score**

Average 79
4.2. User Interface Questionnaire result

Table 2 and figure 4 show the computed result of the UI score from Questionnaire. The minimum score is 68 and the maximum score is 96 with an average of 83.6. It means that the system can fulfill the user’s need in terms of user interface and response time.

| Respondent # | Question Score 1 | Question Score 2 | Question Score 3 | Question Score 4 | Question Score 5 | Question Score 6 | Question Score 7 | Question Score 8 | Question Score 9 | Question Score 10 | Total Score |
|--------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|--------------|
| 1            | 4                | 4                | 3                | 3                | 3                | 4                | 3                | 4                | 3                | 3                | 68           |
| 2            | 5                | 5                | 5                | 5                | 5                | 5                | 4                | 5                | 4                | 5                | 96           |
| 3            | 4                | 4                | 3                | 4                | 4                | 3                | 4                | 3                | 4                | 4                | 74           |
| 4            | 4                | 5                | 4                | 5                | 4                | 4                | 5                | 5                | 4                | 5                | 88           |
| 5            | 4                | 5                | 5                | 4                | 5                | 4                | 5                | 5                | 4                | 5                | 92           |

**Average** 83.6

The overall result shows that Moodle LMS can be accepted by users and it also has a good user interface and quick response time. These results also align well with other studies about the usability of Moodle LMS [1,10,11,12,13] which concludes that Moodle LMS has a good result in the usability test.

5. Conclusion
This paper discussed the usability of Moodle LMS adopted by Statistics Indonesia Learning Center (Pusdiklat BPS). From the evaluation, the system was functioning well, it was acceptable by users and
it could fulfill the users need in terms of user interface and response time. Moodle LMS can be recommended as a reliable e-learning platform in the agency. Future studies will focus on how the user experience with Moodle or other LMS systems can be improved.

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