

# Usability of the Learning Management System and Choices of Alternative

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## **Abstract**

This study investigated the abundance of the Learning Management System (LMS) among teachers in higher education with the replacement of alternative choices. The author hypothesized that users had experienced some problems with the usability of the existing LMS in which alternative systems provide better solutions. We collected data from 41 university teachers in Thailand who had experiences in using LMSs, primarily on Moodle and Google Classroom. Questionnaire items are based on the System Usability Scale (SUS) which were translated into the Thai language and had validity approved by language experts. The results revealed that the overall SUS score was as low as 56.83/100 and individual usability scores were highly correlated with users' continuance or abundance of the LMS usage ( $r = .740$ ,  $p < 0.01$ ). Based on the study, our participants used several alternatives to replace each part of the e-learning system; cloud drive for content management, online quiz maker for quiz-based evaluation, and e-mail for assignment-based evaluation for example. To determine which methods or tools are to be used, our teachers concerned mostly about students' ease-of-use.

**Keyword:** Learning Management System, System Usability Scale, LMS Alternatives, Higher Education

## **1. Introduction**

The Learning Management System (LMS) is a tool to facilitate online learning. There are several known systems that have been using globally for decades such as Moodle, Blackboard, Canvas, and Google Classroom. Based on the E-learning and Educational Technology Department, RMUTI (2018), any LMS will have the following components:

- 1) Content management system; where users post text, links, and upload/download files
- 2) User Account Management System; which controls the access to courses, contents, and keeps records of activities
- 3) Communication system; such as forum, chat, private messaging, and e-mail
- 4) Evaluation system; such as quiz, assignment, and grade book

Unlike the Massive Online Open Course (MOOC) which is publicly opened worldwide, the LMS is often used with locally registered students within the school or institution. Therefore, it is not necessary to have everything online on a single platform. Teachers can still have face-to-face sessions and alternative teaching methods and tools, besides the proper LMS or MOOC, can be used.

Recently many teachers have partially or completely abandoned the LMS usage and there are increasing in popularity of alternative systems such as online quiz tools (e.g. Kahoot!) and social networking (e.g. Facebook). The author hypothesized that users had experienced some problems that affected the usability of the existing LMS where alternative systems provided better solutions. The usability test is also used as a part of the system evaluation (Kularbphettong, Kedsiribut, & Roonrakwit, 2014).

There are studies that implemented the System Usability Scale: SUS (Sauro, 2011), as described in Section 2, to measure the successfulness of the system implementation and to spot the flaws that obstruct the system usage. Our study aimed to measure the overall SUS of the LMS usage in the context where alternative systems are highly available and determine how individual SUS correlates with the user's decision to continue or abandon the LMS usage. We also aimed to find out the LMS alternatives they used to replace each component of the LMS.

## **2. Literature Review**

In this section, we included our theoretical framework, the System Usability Scale: SUS (Sauro, 2011), and some of the related studies.

### **2.1 System Usability Scale: SUS**

The System Usability Scale: SUS was created by John Brooke in 1996. It consists of simple 10 questions used to measure the usability of a particular system. Questions, as commonly used in previous studies, 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.

Choices are weighed using a 5-point Likert scale (5 = Strongly Agree, 1 = Strongly Disagree). There is a unique data interpretation, as described in Section 3.3, which yields the score between 0 and 100. U.S. Department of Health and Human Services (2013) suggested that any system which has the overall SUS score above 68 is considered "above average". It was found that SUS provides valid and reliable results even with a small sample group since positive and negative questions will self-validate responses. The SUS can be used to quickly determine the ease-of-use of the presented system (Bernazzani, 2018).

## 2.2 Related Works

Orfanou, Tselios, and Katsanos (2015) conducted an empirical study to measure the SUS of LMSs used by students from 8 universities in Greece. Data were collected from 11 different subjects using eClass and Moodle as the LMSs using English and Greek versions of the SUS questionnaire, which were later found to have high validity and reliability. The results show an overall high SUS score above 76. The authors also found several correlations with the SUS such as prior experience with the LMS, internet self-efficacy, attitude towards the internet, and usage frequency.

Thuseethan, Achchuthan, and Kuhanesan (2015) investigated the low usability of the LMS (possibly Moodle) in the university in Sri Lanka. Qualitative responses from research participants revealed some key factors that could lead to the low usability and users' satisfaction such as lack of first impression caused by poor user interface design, visual inconsistencies, lack of error prevention and recovery, and inconsistency in using icons.

Harrati, Bouchrika, Tari, and Ladjailia (2016) explore the factors that prevent university teachers from adopting the e-learning system. Data collected from 50 teachers who used Moodle LMS was interpreted using the SUS and the usability metrics evaluation method which traced users' online activities such as the number of clicks, task duration, and completion. The results revealed that the overall SUS score was at 69.3, just the above average level at 68 (U.S. Department of Health and Human Services, 2013). The researchers stated that only the SUS score may not accurately represent the overall system usability since detailed activity records varied based on user experiences.

Previous studies show that the SUS is a simple and convenient, but also valid and reliable, way to measure the system usability. However, using only the SUS method may not enough to conclude the quality of the system. An additional measurement or a qualitative method should be used to provide in-depth information about system usability. From previous studies, it was clear that low usability will cause a lack of system adoption or abundance. In this study, we investigate further to find out what kinds of alternative LMS users used to replace each component of the LMS.

## 3. Methodology

In this section, we clarify how the research instrument (a questionnaire) was created, our participants with the selection scheme, and how we collected and interpreted data.

### 3.1 Research Instrument

The questionnaire used to collect data was prepared using the online survey maker (Google Forms) which was programmed to display items based on previously-responded questions. The questionnaire consists of 4 parts. The first part of the questionnaire has a single question asking about the LMS that was primarily used by the respondents. Only those who had experiences in using the LMS will proceed to the

second part consisting of questionnaire items measuring the SUS, as mentioned in Section 2.1. Questions in the third part asked if they primarily used the LMS alternative or kept using the LMS for each specific task; content management, communication, quiz-based evaluation, and assignment-based evaluation. Common choices for LMS alternatives included social networking, e-mail, cloud drive, and quiz maker. LMS alternatives can also a custom-designed system (e.g. web page with interactive tools) or even an offline method (e.g. paper and pencil). Participants can also identify if they kept using the LMS for that specific task (no alternative used). The fourth path of the questionnaire was asking about the key factors they (teacher users) most concerned when choosing the learning tool. Common answers are listed as follows; teacher ease-of-use, student ease-of-use, playfulness, system functionality, social influence, and technical support.

The questionnaire was created in the Thai language. For the second part (measuring SUS), we translated questionnaire items from the original posted by Brooke (1996) and have language experts verifying the consistency of translation. The questionnaire draft was tested using an additional sample group and repeated with shuffled items. The instrument was approved to have a high reliability of over 95%.

### **3.2 Participants and Data Collection**

Participants of this research included 41 teachers from the university in Bangkok who had experiences in using the LMS provided by their institutions. A convenient sampling method was used in which the questionnaire link was posted in the close social network group and teachers voluntarily responded to the questionnaire. This is under the author's prior acknowledgment that there were participants with different level of LMS usage. The data collection took a single day and the responses were accumulated in the linked spreadsheet.

### **3.3 Data Interpretation**

The second part of the questionnaire (measuring SUS) was interpreted strictly as described by the original creator (Brooke, 1996) as follows:

- 1) For positive items: subtract one from the user response
- 2) For negative items: subtract the user responses from 5

The scaled values span from 0 - 4 (with four being the most positive response).

- 3) Sum up the scaled responses for each user and multiply the value by 2.5.

This will convert the range of possible values to 0 -100.

For the third part of the questionnaire, we display the results as a percentage of users who used a particular system to replace each component of the LMS where the offline system and the LMS itself (no alternative) are possible choices. The same data interpretation was used for the fourth part. The correlation between SUS scores and users' decision was calculated considering 3 = keep using the LMS, 2 = use an online alternative, and 1 = use an offline alternative.

#### 4. Results

The SUS scores of 41 respondents varied between 17.5 and 87.5 with the average score at 56.83 (S.D. = 19.09). Specific SUS scores of each LMS platforms are shown in Table 1.

Table 1 – SUS scores

LMS Platform	N (%)	SUS Score (0-100)			
		Min	Max	Average	S.D.
Moodle	27 (65.85%)	17.5	87.5	52.5	20.14
Google Classroom	9 (21.95%)	47.5	75	57.5	9.84
Other	5 (12.20%)	67.5	85	79	8.4
Total	41 (100%)	17.5	87.5	56.83	19.09

Two out of five respondents who responded that they used other LMS are known that they also used Moodle and Google Classroom (one each) but on their personal accounts which were not provided by the university. The other three respondents did not clearly identify the LMS they used. Systems used for each task reported by the respondents are shown in Figure 1 – 4.

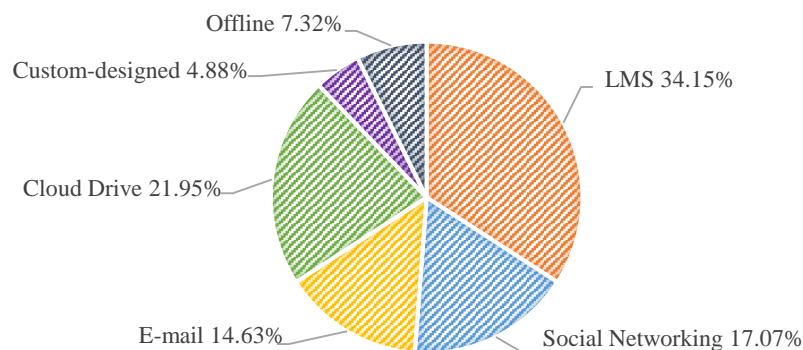


Figure 1 – System used for content management

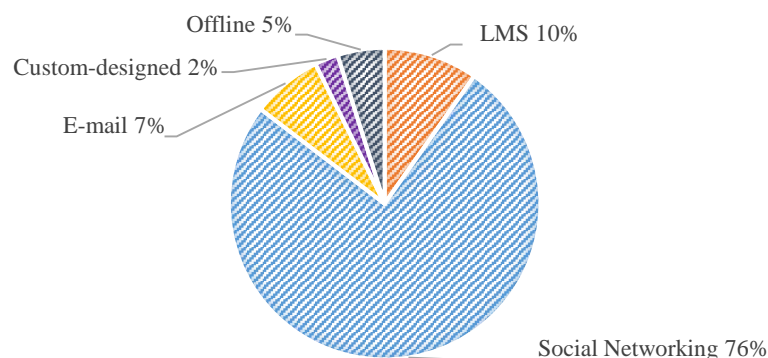


Figure 2 – System used for communication

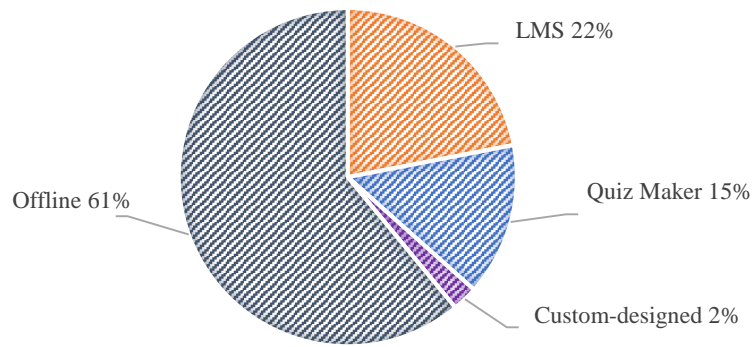


Figure 3 – System used for quiz-based evaluation

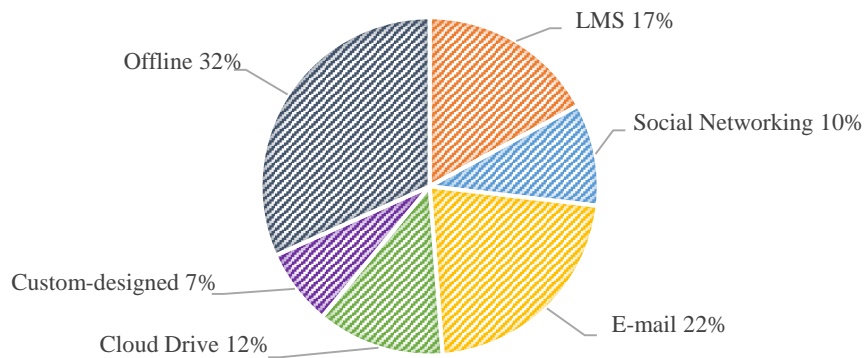


Figure 4 – System used for assignment-based evaluation

The correlation between individual SUS scores and the decision is .740 ( $p < 0.01$ ). Key factors participants most concerned when choosing the learning tool are shown in Figure 5.

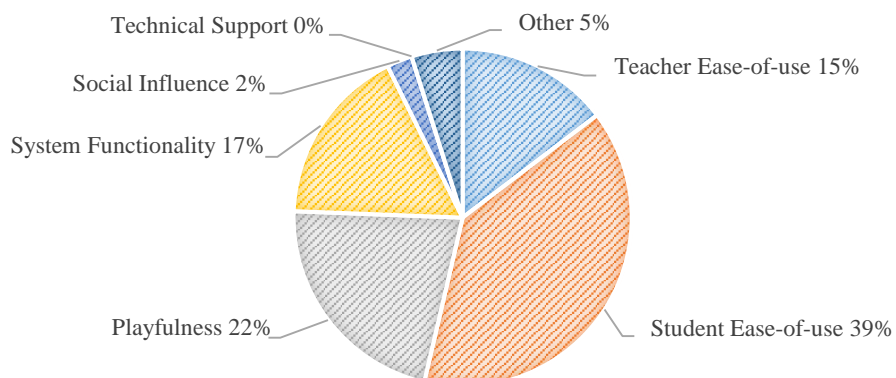


Figure 5 – Key factors participants most concerned when choosing the learning tool

## 5. Conclusion and Discussion

The overall SUS score of all LMS platforms was far below the average level in our context. This is consistent with the high usage amount of LMS alternatives. The content management component of the LMS seems to be the easiest one to use since a lot of people kept using it. For the communication, it can be clearly seen that social networking is much easier to use. Online quizzes seem to be difficult so that most of the users chose the offline method. For assessment-based evaluation, the online methods were still be widely used but with the other tools apart from the LMS. To determine which methods or tools are to be used, our teachers concerned mostly about students' ease-of-use.

Data collecting from multiple groups with different perceptions of using the LMS was done on purpose to increase the systematic variance and enhance the reliability of the correlation test. This can be observed from the high Standard Deviation in our samples. Hence, we can conclude from the correlation test that the fewer usability teachers perceived, the more possibility they will seek for alternatives. If the system usability drops too low, teachers are likely to even step back to use offline methods.

We agreed that LMS alternatives, even offline methods, are effective tools. It is reasonable to use alternatives when the users experience low usability, especially on student's perspective as they play the most important role in the teaching and learning process. However, those alternatives can be used as long as there are locally registered students. As the newborn population is declining, we could expect a smaller number of students to be involved in formal education in the near future. Trends of education in the 21<sup>st</sup> century are also moving towards autonomous learning, making fully-integrated LMSs or MOOCs become the new standard. Therefore, it is important fully-integrated platforms are adopted and perceived positively by university teachers. Factors that lower the system usability should be further investigated.

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