

## COMPARATIVE ANALYSIS OF USABILITY LEARNING MANAGEMENT SYSTEM IN POLITEKNIK LAMANDAU

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**Abstract**— Learning Management System (LMS) is a tool that functions to help online class management, and has become a necessity in the learning process of higher education. Politeknik Lamandau especially in the field of Computer Engineering Technology as a developing tertiary institution has used several LMS including, Edmodo, Schoology, and Google Classroom. In its application, not all users understand the operation well due to usability issues such as complicated appearance, functions menu layout that is not user friendly, speed processing issue, the difficulty of memorizing menu functions, errors in operation that will affect user satisfaction. In this study uses the method a system usability scale test was conducted to measure the usability of the system with five components, like satisfaction, errors, efficiency, learnability, and memorability. The purpose of this study is to determine the LMS usability evaluation based on user responses. The results of the study carried out is term of usability, LMS Edmodo is categorized as acceptable with score 70 while Google Classroom and Schoology are categorized almost acceptable with score 67,6 and 64,4.

**Keywords:** Learning Management System, Politeknik Lamandau, Usability

**Abstrak**— *Learning Management System (LMS) merupakan perangkat yang berfungsi membantu manajemen kelas secara online, dan telah menjadi kebutuhan pada proses pembelajaran jenjang pendidikan tinggi. Politeknik Lamandau khususnya jurusan Teknologi Rekayasa Komputer sebagai perguruan tinggi berkembang telah menggunakan beberapa LMS diantaranya, Edmodo, Schoology dan Google Classroom. Dalam penerapannya, tidak semua pengguna mengerti dengan baik pengoperasiannya dikarenakan menemui masalah kebergunaan/usability seperti, tampilan yang rumit, letak menu yang tidak ramah pengguna, kecepatan dalam pemrosesan, kesulitan untuk mengingat fungsi menu, kesalahan dalam pengoperasian yang akan mempengaruhi kepuasan pengguna. Tujuan dari penelitian ini untuk mengetahui evaluasi usability LMS berdasarkan respon pengguna. Penelitian ini menggunakan metode System Usability Scale untuk mengukur kebergunaan sistem dengan lima komponen yaitu satisfaction, errors, efficiency, learnability, memorability. Hasil penelitian yang dilakukan diketahui bahwa secara usability, LMS Edmodo berada pada kategori acceptable dengan nilai 70 sedangkan Google Classroom dan Schoology berada pada kategori almost acceptable dengan nilai 67,6 dan 64,4.*

**Kata Kunci:** Learning Management System, Politeknik Lamandau, Usability

### INTRODUCTION

The learning process using electronic learning based on management systems becomes a necessity in the academic world [1][2]. The development of technology also affects technology in learning [3]. Therefore, almost all institutions, especially in higher education, have a learning

management system (LMS) that is independently managed or using the free access one. The advantages of LMS are it is not geographically limited and it has easy access [4]. LMS supports distant learning and supports blended learning based [2]. LMS as a network-based learning tool (online) becomes a tool for educators to facilitate teaching and learning, Rating the process and also



the evaluation process starting from the delivery of material, checking attendance of participants, assigning tasks and also final evaluation [5].

Politeknik Lamandau uses several LMS as aids in lectures, including Edmodo, Google Classroom, and Schoology. The major that uses it is Computer Engineering Technology with 2 batches of students. LMS functioned as a place to give announcements, assignment collection, place to download material, record attendance list, and recapitulation of final grades.

In its application, not all users understand well the LMS operation due to usability issues such as complicated display, not user-friendly menu location, causing users difficult. To be accustomed to memorize the LMS menu, speed in processing tasks, uploading the material or downloading. Errors in the operation and the system such as the absence of notification whether the task was successfully uploaded will affect the satisfaction of the user as well. From these problems, it is necessary to measure the usability of the existing LMS.

In this study an evaluation of the use of LMS, is done using the SUS (System Usability Scale) method that measures the level of user convenience when first using an application (learnability), describes the level of user speed in completing tasks (efficiency), measures the ease of using the application after long time unused (memorability), measuring errors made in using the application (errors) and describes user satisfaction in using the application (satisfaction)[6]. This measurement is done to overcome the existing usability problems. With usability evaluation, we can find out the user satisfaction level towards the system [7] [8].

The SUS method was chosen because the testing scale is easily understood by the evaluator, the test results can be trusted even though a little samples and can recommend devices that application that is superior and approach the problems encountered [9][10]. Rating is done using a likert scale questionnaire with range scale 0-100 with answers' format; very dissatisfied, dissatisfied, neutral, satisfied, very satisfied, on the satisfaction component, whereas for other components are adjusted to the type of usability being assessed [11][12]. The questionnaire was given to two batches of students majoring in Computer Engineering Technology at the Politeknik Lamandau as object of research. As a comparison between test results, the ranking method was also used in this study. The purpose of this study was to determine the evaluation and comparison of the usability of the three LMS used at the Politeknik Lamandau, namely Edmodo, Google Classroom, and Schoology.

The results of this study can then be used by users a reference for choosing an LMS based by the needs of the usability element and also as a reference for development.

## MATERIALS AND METHODS

The material used in this study is the number of LMS used in lectures and data on the number of students who use the LMS. LMS data is used to measure and compare levels of usability between programs while data on the number of students is used for distributing LMS testing questionnaires according to the SUS method.

The research method is carried out with a series of stages according to the problems that occur, collecting references and then applying the completion techniques to obtain research results. The research method carried out is illustrated as follows:

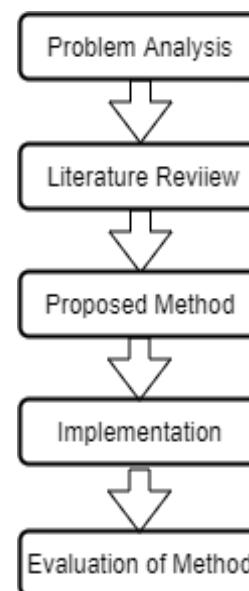


Figure 1 Research Diagram

Based on Figure 1, the stages in the study are described in several steps, namely:

**Problem Analysis:** conduct a review of the problem that occurred to find the part that needs to be evaluated.

**Literature Review:** gathering problem based reference and problem-solving techniques related to the author's research.

**Proposed Method:** proposing problem-solving techniques from the results of literature studies.  
**Methodology:** applying the method chosen to the case.

**Method Evaluation:** testing the method used to determine the results of the study.

**RESULTS AND DISCUSSION**

There are currently three types of LMS used at Politeknik Lamandau that are used in 6 courses in each semester. The following LMS is used as shown in Table 1.

Table 1. The LMS used

No	LMS
1	<i>Edmodo</i>
2	<i>Google Classroom</i>
3	<i>Schoology</i>

While the number of students using LMS consist to batches of classes majoring in Computer Engineering Technology with the details of students as in Table 2.

Table 2. The Students

No	Batches	Total
1	2018	13
2	2019	19

Based on LMS data and student data a rating of using a questionnaire to assess the five usability factors of the three LMS is conducted. From the results of data processing, the questionnaire was filled by 20 students with each 15 questions. There are five components of LMS evaluation, including learnability, errors, satisfaction, memorability, and efficiency.

**A. Systematic Rating Used**

**Satisfaction**

Satisfaction can be interpreted as comfort, user satisfaction in interacting with the system, the higher the level of satisfaction obtained, the more comfortable the user is with the system. The rating scale of satisfaction using the likert scale is shown in Table 3.

Table 3. Rating Scale of Satisfaction

No	Range	Scale
1	Very Satisfied	80-100
2	Satisfied	60-79
3	Neutral	50 - 59
4	Unsatisfied	21-49
5	Very Unsatisfied	0-20

**Errors**

The level of an error on the system greatly affects user comfort, the less error rate, the more the user feels comfortable with the system whereas if there are more errors in the system, the user may feel he must immediately switch to another system.

The rating scale of error components is shown in Table 4.

Table 4. Rating Scale of Errors

No	Range	Scale
1	Very Frequent	80-100
2	Frequent	60-79
3	Neutral	50 - 59
4	Infrequent	21-49
5	Very Infrequent	0-20

**Efficiency**

The efficiency component measures the speed of the system in executing available commands such as moving from one page to another making a quiz making announcements and other things that can be done with LMS. The rating of efficiency components is shown in Table 4.

Table 5. Rating Scale of Efficiency

No	Range	Scale
1	Very Fast	80-100
2	Fast	60-79
3	Neutral	50 - 59
4	Slow	21-49
5	Very Slow	0-20

**Memorability**

The ease level of memorizing the system after a long period of unuse is an important factor in usability, users who are accustomed to will be faster in operating the LMS because it has been recorded in the memory, in contrast to systems with low levels of memorability, the user must re-adapt to the system when using it back after a long time. The rating scale of memorability components is shown in Table 6.

Table 6. Rating Scale of Memorability

No	Range	Scale
1	Very Easy to Memorize	80-100
2	Easy to Memorize	60-79
3	Neutral	50 - 59
4	Hard to Memorize	21-49
5	Very Hard to Memorize	0-20

**Learnability**

The user convenience level when first using the system also influences usability. Systems that provide convenience, the user will continue to use the system to deepen other features. The rating scale of learnability component is shown in Table 7.



Table 7. Rating Scale of Learnability

No	Range	Scale
1	Very Easy	80-100
2	Easy	60-79
3	Neutral	50 - 59
4	Complicated	21-49
5	Very Complicated	0-20

## B. Rating Results by Respondents

### Edmodo

Edmodo get a value that is almost evenly distributed on each component. The lowest value obtained is in error component which can be interpreted as the lower the error value, the less error rate in using the system. As for the value of other components, the higher the better. Figure 2 shows the Rating graph of Edmodo.

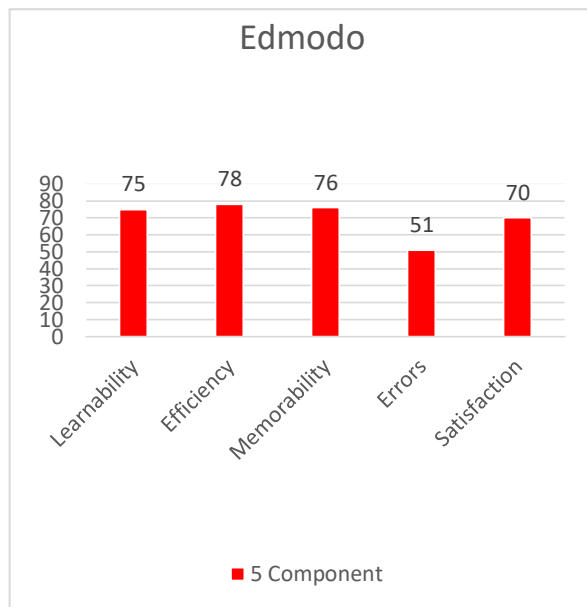


Figure 2 Rating Graph of Edmodo

### Google Classroom

Google Classroom get the maximum value compared to other systems on some components, that are satisfaction and efficiency, showing that the users feel comfortable using Google Classroom, and completing tasks in the system is quite fast. While the value of learnability is at an average value, the error value is below the average which shows that the error rate in Google Classroom is quite low, and the low value on memorability shows that the level of ease when using of the application after some time unused is also quite low. Figure 3 shows the Rating graphic of Google Classroom.

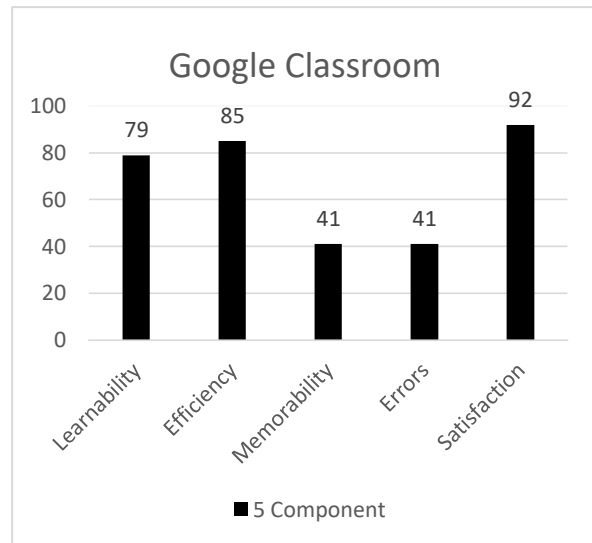


Figure 3 Rating Graph of Google Classroom

### Schoology

The results of the Schoology test show that Schoology gets the highest rating in the learnability component and the lowest error component. The middle value is obtained in efficiency, memorability, and satisfaction. This Rating makes Edmodo as the LMS with the lowest points compared to other LMS. Figure 4 shows the Rating graph of the Schoology.

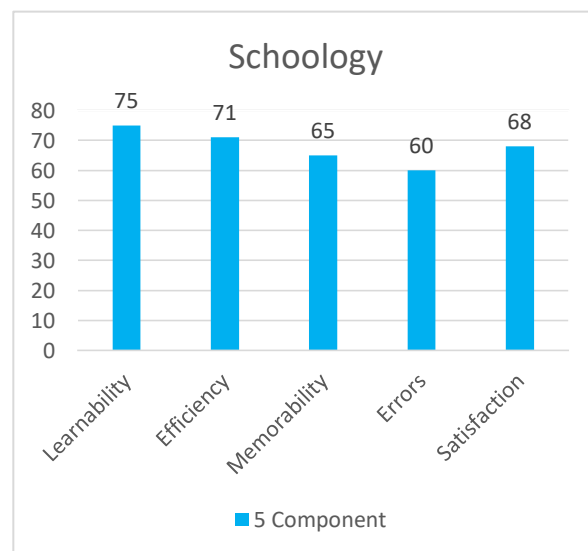


Figure 4 Rating Graph of Schoology

### SUS (System Usability Scale)

SUS test results obtained from all usability components shows that Edmodo is in the first rank, followed by Google Classroom and Schoology with 70, 67.6, and 64.4 points respectively. This accumulation point is obtained by calculating the

average value obtained from respondents which then divided by the number of questionnaire components. Figure 5 shows the comparison of SUS points that have been processed.

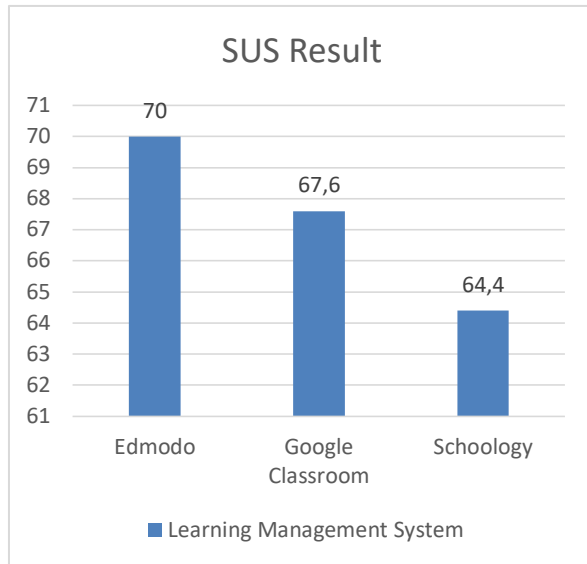
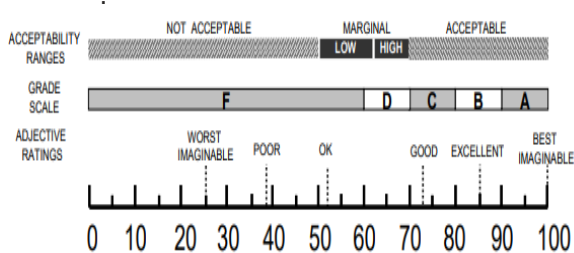


Figure 5 Overall Graph of SUS

Based on the SUS standard, to be accepted in the acceptable category, points earned must be >70 and Edmodo is categorized as acceptable at the lower limit, while Google Classroom and Schoology are categorized as average with an almost acceptable category. The rating determinants of SUS can be seen in Figure 6.



Source : (J. Nielsen, 2012) [6]

Figure 6. Standard of SUS

In addition to the SUS method, testing is also carried out by using the ranking method on each component. The ranking results show that Google Classroom excels in the learnability, efficiency, and satisfaction components. The component with the most errors obtained by Schoology, while Edmodo gained an advantage in the memorability component. These results are quite different if compared to the SUS method, where Edmodo LMS comes out superior. The ranking results can be seen in Table 8.

Table 8. The Ranking of Component LMS

Factor	Ranking		
	Edmodo	GC	Schoology
Learnability	2	1	3
Efficiency	2	1	3
Memorability	1	3	2
Errors	2	3	1
Satisfaction	2	1	3

Google Classroom is superior in the ranking method because the measurement in this method only looks at the final value of the component without processing in like the SUS method, where points in each component are accumulated then divided by the number of components used. The SUS method has an advantage in the interpretation of the final usability measurement, while the ranking method is superior in the interpretation of the results of each component.

## CONCLUSION

Based on the results of tests conducted by the SUS method, the three LMS comparisons have different values at the final result. Edmodo gets a value of 70 and is in the acceptable category, while Google Classroom gets 67.6 and Schoology gets 64.4 which are in the almost acceptable category, because the value is categorized as the average. In the other side, there are differences between ranking test results and the SUS method results. This is indicated by Google Classroom ranking first in the components of learnability, efficiency, and satisfaction. Edmodo excels in memorability while Schoology excels with the most error components. Based on the two test results, Edmodo and Google Classroom can be considered as references for choosing LMS and can also be used as references for LMS development

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