The Teachers' Selection of The Use of Learning Management Systems in Teaching and Learning

Siscka Elvyanti[1,a*], Yadi Mulyadi[2,b], and Iwan Kustiawan[3,c]

[1,2] Dept. Electrical Engineering Education, Universitas Pendidikan Indonesia, Indonesia
[3] Science and Technology Center of Excellent - Technology and Vocational Education and Training – Research Center (PUI TVET-RC) and Department of Electrical Engineering Education, Universitas Pendidikan Indonesia
Coresponding email: sisckael@upi.edu[a]
yadielektro@upi.edu[b] ,iwan_kustiawan@upi.edu[c]

ABSTRACT
The selection of a website as a reference for learning directly affects the quality of information for the person who accesses it. The objectives and expected results of the learning management system depend on the quality of the teaching process and its effectiveness in online access. This research is expected to support teachers who carry out the teaching and learning process virtually during the pandemic. The research method used is quantitative, with a descriptive approach for evaluating, ranking, and choosing the learning management system. Based on the research survey, the criteria for analysis of the LMS platforms in this paper are summarized in three categories: learning skills tools, communication within LMS tools, and ease of use tools. The main goal is to present a comparative analysis of 5 electronic learning management systems. From the teachers' view in this research, only one LMS supports all three categories. The critical criteria of LMS are supported by video conference, chat room for personal discussion, and simple to use.

Keywords: e-learning, learning management system, teaching and learning

INTRODUCTION

The current study explores teachers' use of e-learning websites on how most schools in Indonesia have implemented a learning management system to support teaching and learning during the COVID-19 pandemic. Goyal (2012) presented e-learning as the science of learning without paper-printed instructional material and a revolutionary way of teaching and learning using information and communication technologies (Jung, 2011). Electronic devices and the internet enhance the availability of resources, student performance, and efficient management of the faculty and staff (Garg, Kumar, & Garg, 2018). E-learning gives the advantage is convenient to the learner and can be at least as effective as the classroom under specific situations (Goyal, 2012).

Teaching and learning processes have continuously evolved with technology development. The rapid growth of information and communication technology has shaped intelligent learning environments. For instance, sharing learning materials online has enabled

teachers and students to communicate whenever and wherever. Moreover, the assignments or examinations can also be delivered online with instruction and feedback to support learning outside of scheduled classes (Tinmaz & Lee, An analysis of users' preferences on learning management systems: a case on German versus Spanish students, 2020). A methodology under the learning umbrella of sustainability has made it possible to resume the learning process. This technology is known as a Learning Management System (Alturki & Aldraiweesh, 2021). LMS can facilitate group chats, discussions, document sharing, assignment submission, quizzes, grading, and course evaluation (Bove & Conklin, Learning strategies for faculty during a learning management system migration, 2020). LMSs, allow students and teachers to independently fill their emerging needs by communicating with others and checking their progress (Al-Fraihat et al., 2020). Creativity is essential when teachers use LMS to support teaching and learning. Educational leaders must support the initiative by working with school teams who support the effort. There is a balance that teachers should find between providing active learning with the use of LMS technological resources and using guidelines from the qualified curriculums (Ain, Kaur, & Waheed, 2016).

The use of LMS in the teaching and learning process helps to encourage e-learning by offering instructional learning without constraints on time or place (Asamoah, 2021; Alturki & Aldraiweesh, 2021). Therefore, LMS is appropriate during the COVID-19 pandemic (Alturki & Aldraiweesh, 2021). Most schools and other educational institutes have and operate their learning management system. The others use instant Learning Management Systems (LMSs) to themselves, e.g., Google Classroom, Edmodo, etc. It is crucial to analyze the factors leading to the acceptance of LMS as a sustainable technology for vocational high school students. Therefore, from the viewpoint of teachers, the present paper addresses evaluating, ranking, and choosing the LMS.

LITERATURE REVIEW

During the COVID-19 pandemic, many investigations have been underlined from a literature review and case studies for implementing an LMS. For example, Kite et al. (2020) highlight that LMS has played incredible roles in deploying e-learning for teaching and learning. Alenazy, Al-RAhmi, and Khan (2019) claimed that more interactive learning management system features for students are essential to effective teaching and learning. Students' satisfaction with the teaching-learning process by LMS is influenced by easy-to-use, use-fun, fun, and behavioral (Alenazy, Al-RAhmi, & Khan, 2019).

Related to evaluating the LMS quality, Ehlers (2004) defines "four different components can conceptualize a learning environment: (i) learner, (ii) learning environment, (iii) goal and intention, and (iv) topic and content. To fulfill students' needs and expectations, the current LMS must enable the students to access the course notes on the web, access the learning source, and carry out the quizzes, assignment submission, discussions, chat, grading, and course evaluation (Bove &

Conklin, 2020). Teachers and students can easily modify LMS, get the information they want, and get help by engaging with the teachers (Reid, 2019). All the LMS have different functions that can give users various options. Some modern LMS operate on cloud computing, where it does not need a system administrator with experience in system support and maintenance (Xin, Shibghatullah, Subramaniam, & Wahab, 2021).

Basak et al. (2016) proposed a framework to implement the e-learning system in higher Education using eight factors: pedagogical, management, resources, technological, institutional, social interaction, ethics, and evaluation. The e-learning platforms provide teachers and students with a flexible tool accessible anytime and anywhere (Kraleva, Sabani, & Kralev, 2019). However, the studies have significant results on the difficulty many teachers face transitioning from face-to-face to online teaching (K. Chiasson, 2015), specifically with an emergency immersion of unplanned and rapid online teaching-learning process causing the COVID-19 pandemic. It is unsurprising, then, that online teaching highly depends on teachers' competencies and skills to adapt the pedagogy and new roles.

LMSs play an essential role in students learning experience and satisfaction (Lee & Lee, 2014)). Since there are more platforms that LMS can operate on, such as laptops, phones, and tablets which can give support to students more easily, have high motivation, and be more interested while learning. The current LMS systems are based on cloud computing and do not require a system administrator with experience in software installation. LMS supports chats, forums, and e-book libraries. Teachers and students can easily access and modify e-learning materials to get the information they want and help by engaging with the lecturers. E-learning materials can be easily re-written or/and upgraded, and the student can quickly and easily get in touch with their teacher and get the help they need without being worried by their peers.

Based on research by Liaw (2008), using interactive multimedia education has a significant contribution to improving learning effectiveness. Many e-learning systems provide the opportunity to create interactive multimedia resources. Madhavi et al. (2019) noted that 100% of the students used this e-learning system in classrooms and continued to learn actively outside the institution. Until 2019 LMS platforms were a trend to support face-to-face learning, known as the blended learning method. Force by the COVID-19 pandemic has led to a change in many educational systems around the world, including in Indonesia. E-learning and the LMS platform have become a pivot teaching-learning process. Therefore, teachers need to have prerequisite talents to combine ICT in teaching and mastering, and school leaders have a function in enabling effective use. This examination investigates how faculty leaders help build teachers' capacities to efficiently combine ICT of their coaching and studying at the college level in a public secondary school.

Other studies showed the negative impacts of the e-learning environment, such as diminishing students' interest, reducing the

communication between the lecturer and students, the need for good self-discipline, and responsibility for the learning process (Dutton, Dutton, & Perry, 2012; Anderson, 2008). Besides the positives and negatives of implemented e-learning, some literature presented strategies for comparing different LMS platforms. Poulova et al. (2005) evaluated four LMS platforms – Claroline, Moodle, Blackboard, and Enterprise Knowledge PlatformTM. and Kasim et al. (2016) evaluated six LMS platforms – Moodle, Sakai, ATutor, Blackboard, SuccessFactors, SumTotal using comparative analysis. Moodle and Blackboard have become the most widely considered and investigated platforms and are at the top of almost all rankings (Kraleva, Sabani, & Kralev, 2019).

The LMS needs high-level programming languages such as JavaScript and PHP and databases such as Microsoft SQL Server and MySQL (Xin, Shibghatullah, Subramaniam, & Wahab, 2021). The LMS system works as a web application with different user roles, such as super admin, teachers, parents, or students. Every user has different roles depending on their capabilities. In other words, LMS design and implementation should cater to various learning needs of students that can arise due to diverse backgrounds (Tinmaz & Lee, 2020).

METHODOLOGY

The study aims to provide a clear and understandable conceptual model for comparing LMSs' acceptance as a sustainable teaching and learning process. This study was conducted using an online survey (Tinmaz & Lee, 2020). Before the primary data collection,

a survey instrument was designed and validated to measure characteristics predicting LMS usage. The total sample of the respondent is 148 teachers. A quantitative research model was used with the questionnaires as a data-gathering method. Making an unambiguously defined software specification is vital for quality software development. The features and functions of the software are based on this specification. The factors and criteria for evaluating LMS platforms taken from some references and in this section are presented in TABLE 1.

Regarding data collecting techniques, this study developed the instrument for evaluating the LMS using criteria in TABLE 1. This study used these evaluation criteria to analyze several LMS. And the requirements for teachers' selection of LMS using criteria: (1) easy to use, (2) based on the cloud, (3) able to integrate with various operating systems, (4) synchronous and asynchronous interaction, (5) able to see who was online, and (6) file storing function for the user.

RESULTS AND DISCUSSION

This study is based on quantitative research. The first thing done in this study was the literature review of LMS online. Each LMS is dissected and reviewed online or offline. After searching with the keywords "e-learning system" and "learning management system," the criteria for analysis of LMS are selected. The selection of LMS is to be analyzed based on questionnaire results about the performance of LMS. The collected data of LMS based on 148 participants have been presented in TABLE 2. This study examined the selected

LMS platform. Part of the criteria is taken from LMS websites.

Gender and age were used to classify the demographic factors such as sustainability and LMS use. In terms of gender, 152 are male and female with quantity being equal (male = 76 and female = 76), 41 (27.7 percent) are 26-35 years old, 82 (55.4 percent) are 36-45 years old, and 25 (16.9 percent) are 46 – 55 years old. 148 (97.3 percent) use LMS, and 4 (2.7 percent) do not use LMS during the COVID-19 pandemic. Based on the collected data, using TABLE 2, 96 (64.9 percent) used Google Classroom, and 52 (35.1 percent) used Edmodo. They chose Google Classroom and Edmodo because both LMS is more accessible and straightforward. The total mean scores and standard deviations of each twenty-design item were presented in

TABLE 3, which complies with the criteria set out by teachers. This data was collected from 148 teachers. Within the "learning skills tools criteria, the highest means were observers for lectures using video conference (M = 3.40) and online whiteboard (M = 3.19). Chat (M = 3.25) was revealed as the most valued item of "communication within LMS" criteria. For the last criterion of "productivity tools," the participant's simple navigation was structured (M = 3.78).

Therefore, the study aims to understand LMS design from a gender and age point of view. The general results demonstrated that the LMS design would not always be helpful and appreciated by the teachers (shown by the mean scores).

TABLE 1. Criteria For Analysis of the LMS Platform

Criteria	Activities
Learning skills tools	1. Lectures, videos, etc. (L1) 2. Learning materials are available before lectures (L2) 3. Assignments, exercises, and evaluation: documents, quizzes (L3) 4. Online whiteboard (L4)
Communication within LMS	1. Chat (C1) 2. Forum (C2)
Ease of Use tools	1. Need for a system administrator to manage LMS (P1) 2. Need for installation (P2) 3. Allowing access from mobile applications (P3) 4. Simple navigation structure (P4)

TABLE 2. LMS Criteria Based on Respondent's Perception

LMS Platforms	Learning skills tools				Comm. tools		Productivity tools			
	L1	L2	L3	L4	C1	C2	P1	P2	P3	P4
Moodle	√	√	√		√	√	√	√	√	
Edmodo		√	√		√	√	√	√	√	√
Google Classroom	√	√	√	√	√	√			√	√
Microsoft Teams	√	√	√	√	√	√	√	√	√	
Zoom	√							√	√	√

Only specific activities have the highest mean, such as lectures using video conferences, private storage, and a simple navigation structure. Therefore, Mann-Whitney U tests were used to understand comparison tests better. The Mann-Whitney U test was conducted for gender variables on twenty items of LMS design. The only significant differentiating items appeared on the "need for system administrator to manage LMS" (U=2180.0, p=0.031) of the ease-of-use tool's criteria; the mean rank demonstrated that female teachers (mean rank=101.65, n=74) valued the need for a system administrator more than male teachers do (mean 65.34, n = 74). A few activities as "assignment, exercise, and evaluation," "allowing access through a mobile application," and "simple navigation," has no significant mean rank between males and females.

Table 3. The Mean and Deviation Scores for Each Item of Activities

| Criteria | Activities | Total Sample (N=148) | |
		Mean (M)	Standard Deviation (ST)
Learning Skills Tools	Lectures: video conference	3.40	1.66
	Learning materials are available before lectures	2.73	1.50
	Assignments, exercises, and evaluation	3.02	1.24
	Online whiteboard	3.19	1.66
Communication within LMS	Chat	3.25	1.72
	Forum	3.10	1.58
Ease of Use Tools	Need for a system administrator to manage LMS	3..01	1.33
	Need for installation	3.06	1.38
	Allowing access through a mobile application	3.01	1.53
	Simple navigation structure	3.73	1.66

Table 4. The Mann-Whitney U Tests Result for the ender variable

Criteria	Activities	Mann-Whitney U	p	Gender	Mean Rank
Learning Skills Tools	Lectures: video conference	1608.0	.001	Male (n=74)	76.78
				Female (n=74)	101.64
	Learning materials are available before lectures	2672.5	.009	Male (n=74)	92.87
				Female (n=74)	74.08
	Assignments, exercises, and evaluation: documents, quizzes	2489.0	.001	Male (n=74)	Not significant
				Female (n=74)	
	Online whiteboard	2289.0	.001	Male (n=74)	68.85
				Female (n=74)	96.64
Communication within LMS	Chat	2322.5	.000	Male (n=74)	67.90
				Female (n=74)	96.98
	Forum	2312.0	.000	Male (n=74)	67.34
				Female (n=74)	91.02
Ease of Use Tools	Need for a system administrator to manage LMS	2180.0	.031	Male (n=74)	65.34
				Female (n=74)	101.65
	Need for installation	1877.0	.012	Male (n=74)	71.35
				Female (n=74)	99.50

| Allowing access through a mobile application | 3156.5 | .674 | Male (n=74) Female (n=74) | Not significant |
| Simple navigation structure | 3424.0 | .872 | Male (n=74) Female (n=74) | Not significant |

CONCLUSIONS

This study explored the vocational teachers' perception of the various features of online LMS as a source of sustainability under COVID-19 stay-at-home orders. The process of acceptance of LMS is interpreted by gender and age. The study's goal was to determine the significance of the structural system in developing academic approaches. The use of LMSs in vocational high schools is quite beneficial, especially during the COVID-19 pandemic. On the other side, using LMSs not significantly enhance the student's skill in the psychomotor aspect. From the view of teachers as a user, only for specific activities such as private storage, learning material availability, and simple navigation structure was more useful and appreciated.

In this study, significant age and gender differences were not observed. The only difference observed was those female teachers valued almost all activities except the 'learning materials are available before learning' activities of LMS more than male teachers, which could mean male students favor efficiency when using LMS. Regarding the age variable, this study result indicated that teachers in the range 36-45 years old higher age group valued communication within LMS. As teachers' age increases, they are still convenient with offline communication skills and learning.

Our study explored various features of LMS valued by different groups of teachers based on their gender and age. Out of the research questions, there are several important recommendations for education providers based on our study. First, the future LMS design should consider the individual student's needs fulfilled by learning skills tools and ease of use for users (teachers and students) to reach out to teachers of higher age.

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