Affordances of E-Learning in Indonesian Higher Education Institutions

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Abstract. E-learning has become indispensable since the Covid-19 outbreak in March 2020. The sudden change of learning model might not have been anticipated by many educational institutions, causing a few confusions on how to conduct e-learning properly, especially in providing an e-learning management system (LMS). This study aims to examine the affordances of higher education institutions (universities) in Indonesia in conducting the e-learning during the pandemic. We conducted an online survey towards 100 university lecturers from several universities in Indonesia to ask about the implementation of e-learning in their respective institutions. The questions include the e-LMS used, the preferred learning model, and the challenges for implementation. The results revealed that 79% of the participants used a specially built LMS in their universities, while the rest still used commercially build LMS like Moodle. Then, 82% of the participants prefer blended learning model which combined face to face and e-learning models, and 46% of them wanted to have a fifty-fifty division between face to face and e-learning. As for the challenges, no interaction with students was deemed as the most disturbing challenge for the lectures. The results imply that e-learning will continue to be implemented in Indonesia, regardless of the condition of the pandemic. Thus, universities should provide an e-LMS that can cater all the e-learning needs, while lecturers should also equip themselves with pedagogical as well as technological skills to face the e-learning challenges.

Keywords: e-learning · Learning Management System · technology · higher education

1 Introduction

During the covid-19 pandemic, conducting e-learning is a must for all levels of educational institution to keep the education still going on and to prevent learning gaps among the students. E-learning has been the only available solution for learning during the pandemic The sudden shift from offline to online education was not without certain predicaments. The main challenge for this shift was that online education mostly relies on technology [1]. Therefore, three stakeholders of education, namely students, teachers and the institutions should be familiar with the technology, either as providers or users.

The educational institutions should provide a learning management system that have basic functions such as content management, assessment testing, and mostly video conferencing platform that can substitute the face-to-face classroom meetings. A good LMS

should fulfil the following functions: 1. Facilitating lecturers and students in achieving their learning objectives; 2. As assessment grading; and 3. Class management [2].

The teachers, on the other hands, should be able to master this video conferencing technology as well as other teaching technologies. Since learning was done virtually through video conference, teachers should strive to make their teachings interactive, inclusive, and engaging for their students. To achieve these objectives, teachers may rely on some teaching technologies or applications that can make teaching learning activities more interesting. [3] even asked whether teaching technologies provided ed tech companies are really a panacea.

Finally, the students themselves should be able to understand how to join learning through every gadget they have, either desktop, laptop, even cell phone. Following this new way of learning might not be difficult for the students since they are already familiar with technology. They are even called digital natives [4] since they are surrounded by technology since they were born. For these students, it is more important to keep their motivation during e-learning since they easily get bored. One way to overcome this is to engage them with teaching technologies.

Thus, the biggest challenge in the implementation of e-learning falls on the shoulders of the teachers. On the one hand, if the institutions (schools or universities) cannot provide appropriate course management system, then the teachers should try to find any other means to conduct their e-learning. On the other hand, the teachers themselves should be resourceful in using teaching technologies to maintain their students' engagement in virtual classrooms.

There are several studies concerning the implementation of LMS/CMS in higher educations. Omoregbe, et al. [5] for example, studied the adoption of e-LMS in Nigeria. They found that attitude, social influence, and technology culturation became strong determining factors for adopting e-LMS. [6] did a survey on students' perceived satisfaction toward LMS. They concluded that service quality is the most dominant factor while information quality has the least influence for the satisfaction. Arshad, et al. [7] who studied the implementation of e-LMS in Saudi Arabia reported that they used commercial LMS called Blackboard to conduct e-learning in daily basis.

So far, however, there has been little discussion about the implementation of LMS in higher educations in Indonesia. Nor are there studies on the lecturers' satisfaction level against their institution e-learning system. Most published studies have typically focused on the use of LMS. What remains unknown is whether the lecturers are satisfied with the LMS and how the implementation of e-learning achieve their teaching-learning objectives.

While previous studies mainly concern the lecturers from the same universities, we would like to study further regarding the affordances of E-learning systems from the point of view of lecturers from several universities in Indonesia. There are three research questions in this study:

1. How do university lecturers in Indonesia implement e-learning?
2. How do the institutions LMS support the implementation of e-learning?
3. How do university lecturers cope with the challenges of e-learning implementation?

To find out the answers to the above questions, we conducted a quantitative and qualitative survey analysis to university lecturers.

2 Literature Review

2.1 E-Learning in Higher Education

Learning involves a dependent and independent process. Especially done at schools, the learning and teaching process involves teachers and students in face-to-face meeting. However, as education evolves and highly knowledgeable and skilled workforces are expected in the current work field, education institutions should be able to cater to the needs and requirements by preparing students to be lifelong learners [8]. To achieve this, traditional learning should be enhanced with the use of two or more media, such as audio, images, video, and music to make it more interactive. The multimodal or multichannel learning has been greatly improved by the expansion and advances in Information and communication technology (ICT). Distance education, E-learning, and Virtual Universities are achievements of the ICT which may offer some solutions to overcome the complications of traditional approaches to learning [9].

Before the COVID-19 pandemic, e-learning is often known as computer-mediated learning [10], web-based learning, e-learning system, multi-channel learning, or learning management system. Although it is named differently, e-learning refers to the learning approach that uses an internet connection and allows teachers and students to interact with each other during the teaching-learning process [11]. E-learning has changed traditional or face-to-face learning into online learning [12].

Previous studies state that e-learning provides many advantages for students since it encourages student-centeredness and flexibility [13]. Both asynchronous and synchronous teaching and learning processes may be carried out through e-learning via various tools such as forums, chats, and video conferences [14]. Furthermore, internet technologies may provide many users with the distribution of content simultaneously. E-learning platforms offer lots of advantages to learners, such as control over the content and control of the time spent learning. In other words, the learning process can be adapted according to the learners' needs and learning objectives [15].

2.2 Learning Management System

E-learning has been implemented since a decade ago, either entirely for online learning or blended learning by some universities. One university in Indonesia that has carried out entirely online learning is the Open University, widely known as Universitas Terbuka/UT. This university used a Learning Management System called Tuton (Tutorial Online) that assists students asynchronous learning and Tuweb, which is used for synchronous online meetings. Besides the online learning mode, students were also provided with TTM, or face-to-face learning assistance [16]. Because of this arrangement, the said university was ready to transform into full online learning when the pandemic stroke.

However, this smooth transformation did not apply to numerous universities around the world. Many of them were not prepared for exclusive online learning and yet, they

were forced to adapt to the new learning and teaching style in a short time. A survey carried out across Europe by School Education Gateway stated that 66.9% of respondents informed that they used online platforms for teaching for the first time (School education, 2020). This condition also happens in developing countries, such as India, Uganda, Pakistan, and Indonesia [3, 17, 18].

The implementation of e-learning needs to be supported by a reliable LMS. Some universities in Indonesia, aside from the above Open University, have built their own LMS, such as University of Indonesia, Bandung Institute of Technology (ITB), and Bina Nusantara University. When universities do not have their own LMS, they usually use an open source such as Moodle platforms and commercial ones. The Moodle platform is a web-based flexible learning tool that assists users in collaborating [19].

A good LMS, according to [20] should have four groups of tools: (1) distribution tools that allow teachers to upload and distribute documents; (2) communication tools that allow communication flow from both sides; (3) interaction tools that make discussion possible; and (4) course administration tools that monitor and document the educational process. Similarly, Kulhresta [21] stated that an LMS commonly has some features: content management, assessment and testing, curriculum planning, report generation, communication and collaboration, classroom, and college announcement. While in another study Sezer and Yilmaz [22] specified that an LMS should have several features such as forums, chats, quizzes, assignments, blogs, emails, and wikis. Likewise, Omoregbe [5] offered more tools in an LMS such as a discussion board, a course calendar, information announcement, course content management, electronic mail, review, navigation tools, access control, grade maintenance and distribution, student process tracking, auto marked quizzes, and exam. All of these features should be able to facilitate the transformation from offline to online learning.

2.3   Teaching Technology

Nowadays, many technologies are used in the teaching and learning process: online teaching, blogs, podcasting, interactive whiteboards, and mobile phones. Thus, the teaching-learning process requires technology which later on called technology-enhanced learning (TEL). TEL describes the application of information and communication technologies to teaching and learning. Goodyear and Retalis [23] defined TEL as the technology utilized to assist people in learning in any educational situation. TEL is driven by three key factors enhancing the quality of learning and teaching, meeting learner expectations, and improving access to learning for students off-campus [24].

Technology is merely a tool to reach learning goals. It should help teachers improve their teaching approaches and result in students' success in achieving the learning outcomes. A longitudinal study by [25] revealed a relationship between student satisfaction and teachers' approaches to teaching over time. When the teachers' approach to teaching is more learner-centred, learner satisfaction tends to be more significant. This study also stated that the more experienced teachers are, the more difficult for them to change their teaching approach to using new technology. Ertmer [26] and [27] informed that changing senior teachers' attitudes towards learner-centred learning is complex. This lack of change may occur due to the limited time invested in developing teaching approaches.

The teaching and learning process needs technology, but technology is useless unless teachers implement it in an appropriate context.

3   Methodology

The participants for this study were 100 university lecturers from 17 cities in Indonesia, such as Jakarta, Balikpapan, Denpasar, Pontianak, Salatiga, and so on. Their ages range from 28 to 70 years old, with the average age of 45.58 and the SD of 11.36. From their educational background, 2 persons held S-1 degree, 77 people had master's degree, and the rest 21 people attained Doctoral degree. Meanwhile, their length of service also varied as follows: 19% have been teaching for less than five years, 24% have worked between 6 to10 years, 20% have taught for 11 to 15 years, and the rest 15% have been teaching for more than 15 years.

We contacted the participants through some teachers' associations and distributed the online questionnaire, thus we managed to get 100 responses from the university lecturers, which will be used as the data for this research. There were 18 questions given, consisting of three parts: e-learning implementation, university LMS, and challenges of e-learning. The results of the questionnaire were analysed quantitatively with the use of SPSS statistical program. Hence, some of the responses were described qualitatively.

4   Findings and Discussion

The findings obtained from the study are divided into three subsections. First, data on the e-learning implementation by the lecturers are presented. This includes the preferred learning model, the benefits and disadvantages of online learning and the lecturers' evaluation on their e-learning implementation. Then, findings on the implementation of e-learning system in higher institutions in the lecturers' perspectives. These include the features of LMS, and the effectiveness of e-learning implementation using the LMS. Last, the findings on the participants' opinions regarding the challenges of e-learning and how they cope with the challenges, especially relating to the teaching technology used to improve their teaching.

4.1   E-Learning Implementation

The first thing we asked in the questionnaire was whether the institutions where the participants teach implement e-learning during the pandemic. For this question, 99% of the participants said yes, while only 1% said no. The answer to this question serves as the basis for the following questions.

As shown from Table 1, despite having to conduct online learning fully during the pandemics, 82% of the lecturers prefer to have a blended classroom, meaning that they wanted a combination of online and offline. Relating to their preference of learning model, 53.5% of the participants wanted a 50:50 ratio of online and offline classrooms. That means, if there are 14 meetings in one semester, 7 meetings should be done online and 7 meetings should be offline. Yet, when they were asked regarding the suitability of

Table 1. The e-learning model

Questions	Answers	f	%
In general, which learning model do you prefer? (n = 100)	Traditional	14	14
	Online	4	4
	Blended	82	82
If you prefer blended what is the ideal percentage? (n = 86)	70% - 30%	26	30.2
	50% - 50%	46	53.5
	30% - 70%	14	16.3
Can online learning be applied continuously to course you teach? (n = 100)	Yes	43	43
	No	25	25
	Maybe	32	32

their teaching course with online presentation, only 43% stated firmly that their course materials can be taught online. Meanwhile, 25% said no and 32% chose maybe, meaning they were still considering whether they will be applying online or offline learning.

There were 95 reasons given by the participants relating to the suitability of course materials to online presentations. The most quoted reason (17.89%) was that the course needs practice. A teacher wrote, "because my teaching course involves calculation and practice". This statement indicates that a course that need hands-on practice or calculation such as math is better be taught directly or face-to-face, rather than virtually. Moreover, students' comfortability is also a concern for the teacher, as one participant said, "If we have research, then students have to consult directly with the teacher, that will make them more comfortable." Meanwhile, those who chose online teaching for their courses, stated that technology enable them to carry out every teaching learning activity online.

Mastering technology which makes e-learning possible was listed as one of the benefits of online learning. This is stated by 17.59% of the participants. The first benefit was off course relate to higher flexibility and cost and time saving, which amounted to 50%. With online learning, teachers can work from home at the designed schedule. They do not have to spend time and money for transportation. One participant stated, "I do not have to make a trip from home to class to do my teaching task." Interestingly, being flexible also means that they can multitask, as one lecturer said, "I can do multitasking (can do many things at once), there are many useful sources to make more interesting activities." That means, during online teaching, the teacher can open several applications, such as power point, you tube video, e-book, and even chat room simultaneously in their presentation. One teacher said that there are many learning sources that can be opened at the same time. This is quite difficult to be done when they have to teach directly in front of the class. Because of this, improvement of technological and teaching skills was also mentioned as the benefits of online learning.

On the contrary, the participants also mentioned a number of disadvantages of online learning. The disadvantages can be grouped into three categories. The first category which consists of 48.3% of the responses concerned the students. Teachers mentioned
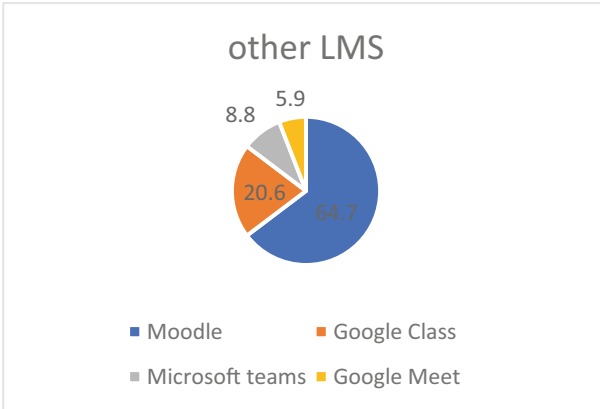
Fig. 1. Other LMS used (n = 66)

that there was no interaction with the students, they cannot control the students, some students were passive and unmotivated, and even students were not ready for online instruction.

One teacher said, "We cannot fully involve the students to really listen to our presentation." The second category reflect the increasing teachers' burden during online learning, which comprised 28.81% of the responses. The respondents stated that they cannot achieve learning objectives, they have unlimited working hours, they have mental exhaustion, and they need more time for preparation. These disadvantages were summarized by one of the participants, "We don't have optimal interaction, we get tired easily as our administrative workload becomes heavier. It is also difficult to manage the online class. Additionally, students have lower understanding and interest." The last category relates to the technology involved for online learning, from internet connectivity to lack of technical knowledge.

4.2 Effectiveness of Learning Management System for E-Learning

To conduct e-learning properly, the institutions need to provide sufficient learning management system (LMS) or also called course management system (CMS). Universities can build their own LMS or use commercial LMS which can be purchased or subscribed by the universities. We asked the participants whether their universities used their own internal LMS, and 79% of the participants said yes, and the rest said no. Some specifically built LMS have their own names such as Binusmaya for Bina Nusantara University, belajar.usd.ac.id. For Sanata Dharma University, Sipejar for Universitas Negeri Malang, and so on. Meanwhile, when the university do not provide LMS, the lecturers use several other LMSs as shown in the following chart (Fig. 1).

From 66 responses, Moodle was the most popular application used by the lecturers, chosen by 65% of the participants. According to its website, Moodle is a free and open-source learning management system to help educators create effective online learning that can be customized for any course or teaching method. The second chosen application was Google Classroom, then followed by Microsoft Teams. The last one, Google Meet

Table 2. Features of LMS

Features	f	%
Video Conference	89	21.34
Discussion Forum	87	20.86
Course Material (PPT)	83	19.90
Quiz/Assignment	76	18.23
Learning Video	75	17.99
Exercise	1	0.24
Informal chat	2	0.48
Course module	2	0.48
Score database	1	0.24
Total	417	100

Table 3. Effectiveness of e-learning

Questions	VP	P	S	G	VG
In your opinion, how is the online lecture materials that you currently provide?	0	2	35	49	14
In your opinion, how effective is the online learning that you are currently doing?	1	5	45	46	3
Overall, what do you think about the implementation of online learning in your institution?	1	5	29	49	16

(VP = very poor; P = poor; S = sufficient; G = good; VG = very good)

was chosen by 6% of the participants, even though Google Meet cannot be categorized as a learning management system because it only provides video conference feature as the main requirement for online learning.

To conduct a proper e-learning, several features should be provided by the LMS. These features are listed in the following Table 2.

For the question of the LMS feature, there are five choices given and the participants can tick more than one feature, so the total responses were 417. The most needed feature is video conference. Video conference can be done by integrating LMS with other video conferencing applications such as Zoom, Webex, or Google Meet. This feature is important since it still allow synchronous meeting between the teachers and the students. The next one is Discussion Forum (DF). A discussion forum can become a communication platform in the classroom. Course materials were also important to be provided in the LMS. The last two features are Assignment and Learning Videos.

The features of the LMS can help lecturers conduct their e-learning effectively. We asked three questions regarding the implementation of e-learning using the LMS provided by their universities. The answers can be seen in Table 3.

Table 4. Challenges of e-learning (n = 135)

No.	Challenges category	f	%
1	Technical	74	54.81
2	Practical	11	8.15
3	Interactional	47	34.81
4	No challenge	3	2.22

In relation to the teaching materials they provided, 53% gave positive responses, and 35% confirmed that they were sufficient. Similar responses were given for the second question about the effectiveness of their online teaching. 49% felt their teaching were effective or very effective, while the rest still consider it quite effective or rather effective. Meanwhile, when the question is about the implementation of online learning in their institutions, most of them (65%) gave good and very good answers.

4.3   Coping with the Challenges of E-Learning

Implementing e-learning was not without challenges for the lecturers, especially for those who were unfamiliar with technology or lacking behind the technological advances. Table 4 displays some challenges faced by the teachers.

Similar to the disadvantages of e-learning, the biggest challenge for the participants related to the technical matters. These include the internet access, lacking digital skills, technological dependence, and also electricity power. A stable and fast internet connectivity is a must to conduct e-learning smoothly especially during the video conference sessions. The second category related to the teachers' practical challenges such as exhaustion, time management and inappropriate teaching method. The last one is interactional challenges which involved the students. Again, teachers stated that it was difficult to motivate the students, control them or interact with them through online meeting.

To address those challenges, the participants stated their requirements to make their online learning successful. First of all, they needed stable internet connection. The second one is the interactive teaching method, which can be applicable for online learning. The third one, teachers also need learners' autonomy, meaning that the students have to be able to study on their own, not always depend on the teachers.

In line with the requirement of the interactive teaching method, we asked the participants whether they use other teaching technologies or applications to make their presentations more interesting and interactive. Table 5 shows the responses on participants' preferred technology used. For this question, 59% of them said yes, while the rest said no. That means, they still teach as if they were in front of the classroom by just lecturing or presenting their materials. Meanwhile, those who said yes shared the applications they are using.

The technologies or applications listed here are mainly aimed for creating interesting presentations and videos such as Canva, presentation design, and Adobe spark. The other category is interactive teaching platform such as Kahoot, Padlett, Mentimeter, and

Table 5. Technology used (n = 45)

Teaching Technology	f	%
Canva	8	12.90%
Kahoot	5	8.06%
Padlett	4	6.45%
Screencast	4	6.45%
Mentimeter	4	6.45%
Jamboard	3	4.84%
Flipgrid	2	3.23%
Video maker	2	3.23%
Wordwall	2	3.23%
Genially	2	3.23%
Quipper	1	1.61%
Mindmap	1	1.61%
Open journal system	1	1.61%
Ruang guru	1	1.61%
Presentation design	1	1.61%
Video editor	1	1.61%
Screen Recording	1	1.61%
Adobe Spark	1	1.61%
Podcast	1	1.61%

Flipgrid. These technologies can help teachers increase students' engagement in virtual classrooms, which might solve one of the teachers' concerns relating to the lack of students' motivation in online learning.

5   Discussion

In this research, we tried to look into the university lecturers' perspectives concerning the implementation of e-learning in the university where they work. Successful implementation of e-learning depends on the teachers' perceptions towards e-learning, the institutions' support by providing e-LMS, and the teachers' ways of coping with the challenges.

For the first research question, we found that most teachers (82%) preferred to have blended learning model, in which they have a combination of online and offline learning sessions with their students, with a fifty-fifty division between online and face-to-face meetings. These results suggest that teachers still need to have traditional face-to-face classroom meeting. The outcome is similar to our previous research with the participants from the same university [28]. Thus, the need for blended learning model is deemed

necessary as full online learning is not favourably chosen. The blended learning model might become a solution for faculty members who might have expertise in traditional teaching but still do not have enough expertise in online teaching [1] and so they are likely to experience profound differences and challenges. A half and half division between online and offline teachings can help teachers improve their teaching and technological skills to face the challenges of education in the future. Wong [29] suggested that blended learning will be more widely used and become routine in post pandemic period.

Meanwhile, higher education institutions can play an important role in the implementation of online learning by providing a good and reliable learning management system [30] The fundamental role of LMS in higher education is to enable connections and interactions between three constituents: students, teachers, and content [31]. Our study found that 79% of the participants used the LMS provided by their own institutions, while the others used commercial ones, such as Moodle or Blackboard. This result indicates that most universities have been well prepared for the technological transformation in education by building their own LMSs. In other countries, however, many higher institutions still use commercially built LMS. For example, Saudi Arabia used Blackboard [7] and India used Moodle [32]. Besides, faculty members also gave positive appreciation to the implementation of online learning in their universities.

Despite the support of the institutions, the implementation of e-learning was not without challenges. Some challenges were reported by the participants in this study. The first one is the internet connection. In developing countries such as in Indonesia and India, internet is still major problem, since not all regions within the country can enjoy similar connectivity [18, 28]. Until now, internet connection and computer facilities are still unsolved problem in many formal education institutions [33].

The second biggest challenge for the teachers in performing online learning is lack of interaction with the students. This particular problem has been found in almost all studies regarding the challenges of e-learning [3, 34, 35]. Teachers complained that without direct interaction, they cannot see whether the students understand the lessons or not, whether they were paying attention or not, and so on. Virtual meeting does not enable teachers to see all their students in a small computer screen. Moreover, most students prefer to turn off their web camera during online lesson for many reasons. Thus, teachers cannot that the students were engaged during the lessons.

Finally, our study also found that teachers feel that they workload added significantly when they have to conduct e-learning. This include preparing the materials, preparing online activities, doing administrative works, and learning some new technological stuffs. This finding corroborates Zhao and Song's [36] study regarding the supports that the teachers needed for e-learning.

To address the challenges brought by the implementation of e-learning, 35% participants requested more stable internet access. Besides, they also try to use some teaching technologies or applications to make their e-learning more interesting and engaging for the students. The ability to acquire digital competences, such as mastery of teaching technology, will become a necessity in the various learning process [37]. Therefore, teachers should always improve their digital skill so they will be well equipped to teach in any circumstances, either online or offline.

6   Conclusion

In the present article we investigated three research questions: how university lecturers implement e-learning, how do their institutions support by providing LMS, and how do lecturers cope with the challenges of e-leaning. The results of the study suggested that online learning still have to be paired with traditional learning mode as not all the faculty members are ready with the full transformation towards e-learning. On the other hand, the implementation of e-learning should be fully supported by the institutions by providing reliable LMS which enables teachers to manage their online courses smoothly. However, teachers should also actively improve their e-learning competence, such as by learning teaching technologies. Even though teaching technology cannot fully solve all the challenges of e-learning, at least they can increase the students' engagement, which become the most mentioned challenge in e-learning.

At present we have not addressed the questions of strategic implementation of technology to increase students' participation and motivation, also how the teachers cope with increased workload during e-learning. Further research may extend this work by delving into teachers' practical strategies to address this problem.

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