Examining Lecturers' Learning Management System Usage Using TAM: Eastern Indonesia Case Study

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Abstract

The implementation of Learning Management Systems (LMS) in higher education institutions continues to increase in line with the growing demand for flexible digital learning, with the assumption that LMS is an easy-to-use platform that will be naturally accepted by lecturers. This study aims to analyze the factors that influence the adoption of LMS among lecturers at higher education institutions in Eastern Indonesia. This study uses a quantitative cross-sectional survey. The research instrument, comprising 25 items classified into five constructs —Constructivist Pedagogical Beliefs, Traditional Pedagogical Beliefs, Perceived Ease of Use, Perceived Usefulness, and LMS Use —was administered to lecturers at a private university in North Sulawesi. Using the Partial Least Squares-Structural Equation Modeling approach, this study incorporates the Technology Acceptance Model with a constructivist and traditional pedagogical belief orientation. The results show that three of the eight variables significantly influence LMS usage. The findings indicate that constructivist pedagogical beliefs and perceived usefulness have a significant influence on LMS adoption, whereas traditional pedagogical beliefs do not have a significant impact. These results have practical implications for universities in designing training policies and strategies to optimize LMS usage

Keywords— Learning Management System, Technology Acceptance Model, Pedagogical Beliefs, Perceived Usefulness, Perceived Ease of Use, Higher Education

1. INTRODUCTION

The education sector must make numerous changes and adaptations in response to the development of information technology, in order to conduct learning more efficiently and effectively. Due to this, Learning Management Systems (LMS) has become mandatory in global education, where quality education can be achieved by implementing learning activities in a more efficient manner [1]. LMS facilitates the online learning process, enabling educational institutions to manage, distribute, and track learning activities efficiently [2]. In Indonesia the adoption of LMS in various education levels is suppoeted by its government, the Ministry of Education, Culture, Research and Technology, through various initiatives, such as the 'Digital School' program and e-learning in elementary and secondary schools. Nonetheless, LMS adoption in Indonesia still faces various challenges [3].

LMS plays a crucial role in the modern education landscape, as distance learning is becoming increasingly prevalent, with many educational institutions being compelled to transition to online learning [4], [5]. As a digital platform that enables the management, distribution, and tracking of teaching and learning activities online. An LMS enables educational institutions to create a virtual learning environment that is self-directed to the students [6], [7]. It is flexible and reliable, allows the students to participate actively in collaborative learning environment [8]. It thus offers the expediency by integrating the teaching and learning process into an efficient and structured platform.

This study aims to examine the effect of pedagogical beliefs on LMS adoption among higher education lecturers in Eastern Indonesia. This factor is relevant, as many higher education institutions in Eastern Indonesia have only recently begun to undergo a massive digital transformation in their teaching and learning activities since the COVID-19 pandemic hit. Additionally, the digital divide is a real problem in areas outside Java. Specifically in Eastern Indonesia, technological infrastructure, internet access, and digital literacy are major challenges. According to the 2024 Information and Communication Technology Development Index report [9], the growth of Information and Communication Technology development in Eastern Indonesia has not been able to keep pace with the progress made in Western Indonesia, particularly on the islands of Java and Bali. The ICT access and infrastructure index for most provinces in Eastern Indonesia is still in the range of 3.94–6.06, compared to provinces in Western Indonesia, which are in the range of 6.20–8.41. A similar pattern is also found in the ICT usage index. Therefore, it is important to examine other factors that influence the use of LMS, such as human resources, in context of this study lecturer pedagogical beliefs. The adaptation of pedagogical values can be a barrier to technology adoption, notably LMS. In addition, the perception of lecturers that LMS is not just a 'complement' is an important factor. Therefore, this study adopted and extended the Technology Acceptance Model (TAM) proposed by [10] to understand the factors that influence lecturers' use of LMS in higher education in eastern Indonesia.

1.1. Learning Management System

The primary feature of LMS is course management, which allows instructors or lecturers to create, manage, and modify courses tailored to their specific needs. It enables the organization of learning materials into modules, allowing students to follow the learning process in a progressive manner. As various file formats, such as PDF documents, videos, and presentations, can be uploaded to this platform, digital distribution of learning materials become easier [6]. At the same time, LMS also supports independent learning by providing flexible access to materials, allowing students to learn at their own pace.

Another advantage of LMS over conventional learning methods is its assessment and evaluation. In LMS, instructors can create online quizzes and exams that can be automatically graded by the system. Students can submit assignments through LMS, and instructors can provide immediate feedback on the same platform. This speeds up the evaluation process and minimizes errors in grading. Thus, it not only improves efficiency but also provides transparency in academic evaluation [11]. The LMS system also supports collaboration and interaction between instructors and students. Through discussion forums, chat rooms, and other collaboration tools, students can ask questions and discuss topics without needing to meet in person. Additionally, a key feature that distinguishes LMS is its performance monitoring capabilities. LMS allows instructors to track student activity, including how often they access materials, when they submit assignments, and their performance in quizzes or exams. This data can be used to identify students who may need additional support, as well as to measure the overall effectiveness of the course. Some LMSs provide analytical dashboards, which graphically visualize student progress, making it easier for instructors to make data-driven decisions [12]. To conclude, LMS provides convenience in managing materials, assignments, communication, and evaluation digitally.

Popular LMS platforms like Google Classroom, Moodle, and Microsoft Teams integrate these features.

a. Google Classroom is an online platform that enables teachers to manage classes, deliver materials, and assess student progress. Assignment are organized in one place for structured learning [13]. Online quizzes and exams ease assessment [14] The platform is known for its simplicity and integration with Google's suite, like Drive and Docs, enabling real-time collaboration. Students work together on projects, edit documents simultaneously, and exchange feedback [15], supporting collaborative learning and social interaction.
b. Moodle is the most widely used open-source LMS in educational institutions. Moodle can be installed independently on an educational institution's server, allowing it to have full control

over data and security [16]. This LMS offers a range of features that cater to various learning models, including synchronous, asynchronous, and blended learning approaches. The features provided include course management, discussion forums, interactive online quizzes and exams, assignments and assessments, communication tools (messaging features), multimedia support, mobile accessibility, and an integrated grading system [17]. With Moodle, teachers can upload materials in various formats, including text documents, presentations, and interactive multimedia. Students can also actively participate through forums, chat rooms, and other collaborative activities provided. Moodle's main advantage lies in its flexibility. Users can customize the visual layout, course structure, and add various plugins to suit their needs. Additionally, Moodle features a learning analytics tool that enables teachers to monitor student activity and track course completion, allowing them to understand students' performance and behavior patterns.

c. Microsoft Teams is a cloud-based collaboration and communication platform that provides a digital workspace to support real-time teamwork and communication. Although not specifically designed as a complete LMS platform like Moodle, there are several features in Teams that allow it to function as an LMS. Lecturers can create classes (or class teams), where the team owner can assign tasks, share learning materials, initiate meetings, and control who can post in the team. In a study of [18], Microsoft Teams serves as a central hub, where custom applications built using Microsoft Power Apps for teaching, quizzes, and exams are integrated. Built-in features of Microsoft Teams are used in conjunction with these applications to support educational activities. The study of [19] utilizes Microsoft Teams as a collaborative and cooperative online learning tool in graduate project management modules, where students can engage in group discussions and negotiations. Lecturers can observe group activities by switching between channels, much like in a physical classroom.

Various LMS platforms offer diverse and sophisticated features, but the level of utilization, especially among lecturers, is not solely determined by the availability of this technology. There are a number of factors that influence the use of LMS, including technological infrastructure [20] which has a positive effect on the continuity of LMS use [21], [22]. A similar study conducted in Indonesia reaches the same conclusion [23]. On the other hand, non-infrastructure factors such as subjective aspects and job relevance [24] as well as pedagogical beliefs, are non-technical factors that have been found to be significant predictors of LMS adoption [10].

1.2. Technology Acceptance Model

To predict and explain the factors that influence whether technology is used or not, according to human perception (i.e., users), in 1989 Davis proposed TAM [25]. According to TAM, there are two fundamental determinants that influence the decision to use a system, namely Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). PU refers to perceived usefulness: the degree to which a person believes that using a particular technology will improve performance. PEOU refers to the ease of use of the system; the degree to which a person believes that using a given technology would be free from effort.

It has been widely used and extended to enhance its predictive capabilities by incorporating various external variables that might influence users' perceptions of technology use. However, the classic TAM and its extension are similar in terms of measuring technology acceptance according to a three-stage process [26]. External determinants (such as subjective norms, job relevance, resources, system features) prompt cognitive response (PU and PEOU) – first stage, which shapes the attitude or intention to use the technology – second stage, which influences actual usage behavior – third stage (Figure 1). TAM is an established theory used to understand the usage intention of LMS worldwide [10], [20], [21], [27], [28], [29], including in Indonesia [30], [31], [32], [33]. Some studies employ TAM’s extension such as UTAUT [22], [34].

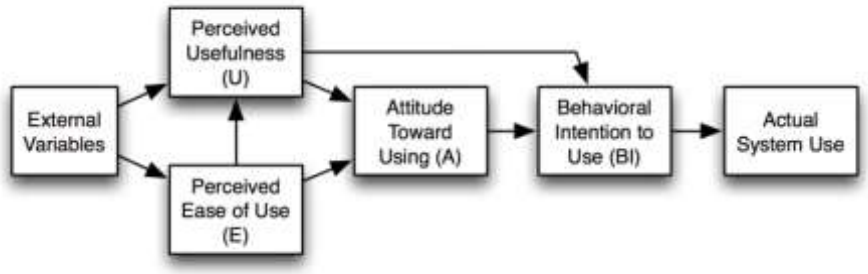

Figure 1. Classic Technology Acceptance Model

This study adopts the reduced TAM model developed by [10] to understand academic staff's adoption of Moodle. PU and PEOU were retained as the principal predictors of LMS actual usage (Figure 2). In addition, the study integrates two external determinants that explain pedagogical belief systems, which are considered essential psychological factors that determine how academic staff view and use technology in teaching. These two pedagogical factors are Constructivist Pedagogical Beliefs (CPB) and Traditional Pedagogical Beliefs (TPB). CBP measures lecturers' beliefs about active learning-based learning approaches, which emphasize active, creative, and collaborative learning processes in the use of the LMS. Lecturers see teaching as student-centered, inquiry-driven, and participatory. Instead, TPB measures lecturers' beliefs about traditional- based learning approaches, which emphasize the transfer of knowledge from teachers to students in the use of LMS. Lecturers often view teaching as teacher-centered, focusing on the delivery of content rather than the student's learning experience. These two constructs influence the PU and PEOU of the LMS as well as lecturers' decision to actively use it. PU, in this study, describes the extent to which lecturers believe that using LMS is helpful in their academic jobs. PEOU describes the extent to which lecturers believe that using LMS requires little effort and provides the academic facilities they need. These two factors influence LMS usage (US).

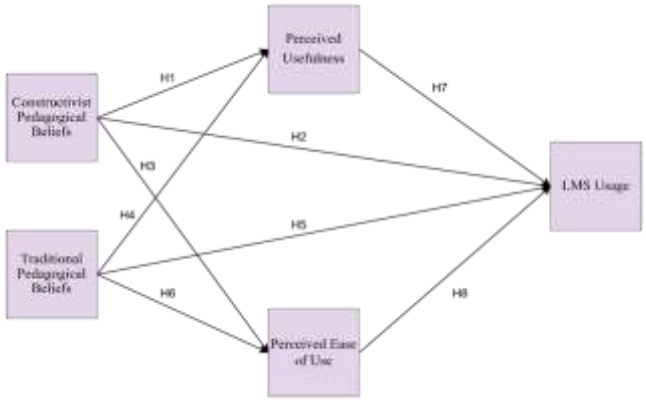

Figure 2. Extended TAM with Pedagogical Beliefs as External Factors [10]

The authors provide no clear argument as to why *Attitude* and *Behavior Intention* were omitted from their model [10]. Some recent studies such as [35], [36], [37], [38], [39] support this simplified TAM model, in which PU and PEOU are the core determinant that have direct effects on actual use of LMS. Attitude and intention become weak mediators that are not always dominant [38], [40], as they explain relatively little additional variance. Particularly, forced-use LMS environments might lessen variance in attitude and intention [37], [38]. In the context of this study, Indonesian government policy can become a forced-use environment. The establishment of higher education performance indicators and accreditation encourages the

adoption of digital systems in the education. The implementation of digital learning is one practice of digital transformation in education. The use of LMS is one such form. Therefore, the use of LMS may not be a choice for lecturers, due to mandatory conditions. Additionally, the digital divide can be one reason why intention is not relevant for predicting actual LMS use. In conditions where access to and facilities for information technology are still limited, lecturers cannot use LMS intensively. Thus, attitude and intention may not always be strong predictors of actual LMS use.

1.3. Hypothesis

This this study follows the research model of [10] (Figure 2) and its associated hypothesis to examine lecturers' usage of LMS in a private higher education institution in eastern Indonesia. The hypotheses are as follows:

a. H1: There is a significant relationship between CPB and PU
b. H2 : There is a significant relationship between CPB and US.
c. H3 : There is a significant relationship between CPB and PEOU.
d. H4 : There is a significant relationship between TPB and PU.
e. H5 : There is a significant relationship between TPB and US.
f. H6 : There is a significant relationship between TPB and PEOU.
g. H7 : There is a significant relationship between PU and US.
h. H8 : There is a significant relationship between PEOU and US.

2. RESEARCH METHODS

This study employs a quantitative approach with a cross-sectional survey design, which allows for data collection in a short time and provides an overview of the relationship between variables at a single point in time. Relevant variables are measured at the same time, making it possible to analyze the relationship between various factors in the same population at the same time [41],[42]. This research starts from identifying problems related to the use of LMS by lecturers, followed by determining the population and sample through purposive sampling to select active lecturers who use LMS, and selecting a research model using the Technology Acceptance Model (TAM).. Data were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach, as it provides a deeper understanding of the dynamics between variables in complex research contexts. The results of the analysis were then used to formulate conclusions and suggestions relevant to the research objectives.

2.1. Participant

The participants in this study consisted of lecturers from a private university in a district in North Sulawesi, a province in Eastern Indonesia. From the process of distributing questionnaires conducted through Google Form, a total of 81 responses were obtained. In accordance with research ethics, the respondent's personal information was not collected, except for gender, age, and education level.

Table 1. Respondent Profile

Description	Total	Percent (%)
Gender		
Male	51	63.0%
Female	30	37.0%
Age		
25-30	11	13.5%

31-35	9	11.1%
36-40	16	19.8%
41 - 45	19	23.5%
46 - 50	9	11.1%
51- 55	14	17.3%
> 56	3	3.7%
Education		
Bachelor's degree (S1)	1	1.2%
Master's degree (S2)	66	81%
Postgraduate (PhD)	14	17.3%

As shown in Table 1, they included 51 (63%) males and 30 (37%) females from seven different departments (theology, economics and business, computer science, nursing, education, engineering, and agriculture). In terms of gender, the respondents were predominantly male – a common phenomenon among lecturers at universities in Eastern Indonesia, but still comparatively balanced. A total of 43.2% of respondents were aged between 36 and 45 years, a productive age range with sufficient experience to understand the pedagogical context, while also having high potential to adapt to the latest technology. Regarding academic qualifications, 81% hold a master's degree, and 17.3% hold a doctoral degree.

2.2. Data Collection and the Instrument

With the permission of the university's administrator, data collection was conducted by administering the online questionnaire in two ways. One way is through email to the respondents, and another way is for the researcher to meet the respondents and administer the questionnaire. Only university lecturers who were lecturing and using an LMS that was involved in the study were included.

As previously mentioned, this study adopts the extended TAM model developed by [10]. The same study proposed an instrument to examine the influence of pedagogical beliefs (constructive vs. traditional) on how university lecturers use the learning management system, which was also adopted in the current study. The instrument comprises five constructs: CPB, TPB, PU, PEOU, and US. Each construct has five items. The instrument was translated into Indonesian and has been approved by a language expert.

3. RESULT AND DISCUSSION

Table 2 shows the descriptive statistics for each item of each indicator, including the sample size, maximum value, minimum value, standard deviation, and mean. All items have a mean value that is higher than the standard deviation, indicating that they tend to be homogeneous. The CPB mean values range from 3.385 to 3.646, with a low standard deviation, indicating a positive and consistent perception of lecturers towards constructivism-based learning. The TPB mean values are slightly lower, ranging from 1.815 to 2.369, but this still demonstrates the uniformity of respondents' perceptions due to the low deviation, suggesting that that most lecturers do not actually adopt traditional teaching approaches.

Table 2. Descriptive Statistics

Name	Mean	Scale min	Scale max	Standard Deviation
CPB1	3.585	1	4	0.721
CPB2	3.646	1	4	0.567
CPB3	3.4	1	4	0.576

CPB4	3.385	1	4	0.625
CPB5	3.554	1	4	0.583
TPB1	2.369	1	4	0.622
TPB2	1.862	1	3	0.523
TPB3	1.815	1	4	0.654
TPB4	1.815	1	3	0.523
TPB5	1.908	1	4	0.696
PU1	3.354	2	4	0.539
PU2	3.354	2	4	0.509
PU3	3.385	2	4	0.517
PU4	3.369	3	4	0.483
PU5	3.385	2	4	0.546
PEOU1	3.138	2	4	0.551
PEOU2	3.215	2	4	0.48
PEOU3	3.185	2	4	0.579
PEOU4	3.215	2	4	0.511
PEOU5	3.262	2	4	0.505
US1	3.492	3	4	0.5
US2	2.646	1	4	0.666
US3	3.415	2	4	0.552
US4	2.862	1	4	0.699
US5	2.908	1	4	0.626

The PU construct showed a high mean value, ranging from 3.354 to 3.385, and a low standard deviation, indicating that respondents generally considered the LMS useful in supporting teaching activities. The same can be seen in the PU construct, with indicator means ranging from 3.138 to 3.262 and low deviation, indicating that the LMS is considered easy to use by most lecturers. Meanwhile, items of US construct, although there is a slightly larger variation than other constructs, the average value still illustrates that most lecturers have used the LMS actively, albeit with varying intensity and methods.

3.1. Measurement Evaluation (Outer Model)

3.1.1. Convergent Validity

Convergent Validity is tested by looking at the Loading Factor value of each indicator on each variable. The loading factor indicates how strongly the indicator measures the variable in question. If the Loading Factor value is high, it indicates that the indicator is a valid representation of the construct. Thus, the analysis becomes stronger and more reliable.

In the first stage of measurement model testing, four indicators do not meet the convergent validity requirements because their factor loading values are below 0.6: TPB3, TPB5, US2, and US4. In accordance with the procedure, the four indicators were eliminated from the model. Factor loading values of these four items, which below the threshold of 0.6, may not be due to item quality. This may indicate the pattern of LMS usage at the research site. During the pandemic, lecturers adapted to using LMS based on pragmatic considerations. As a result, the use of LMS became partial, as a medium for uploading materials and assigning tasks. Meanwhile, test-based assessments were still conducted manually or offline. This causes the interactive feature of LMS to be suboptimal. Another condition that may explain this is that the LMS is not

the only platform used in the classroom. Lecturers and students tend to use other media such as email and social media (WhatsApp) for knowledge and information sharing [43].

Following the elimination of 4 indicators, the results of testing the measurement model in the second stage only contain indicators whose Loading Factor has a value of not less than 0.6 and meet the requirements. All indicators have met good Convergent Validity (as shown in Table 3 and Figure 4).

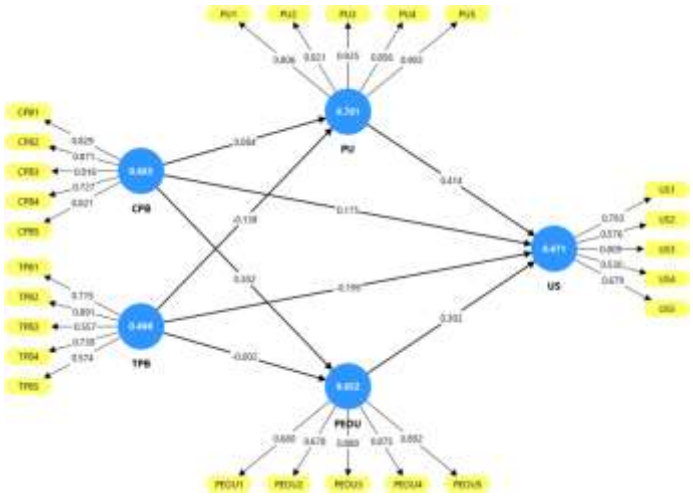

Figure 3. Stage-one Measurement Model Testing Results

Table 3. Loading Factor Value Measurement Model

Variabel	First Stage		Second Stage	
	Indicator	**Factor Loading**	**Indicator**	**Factor Loading**
Constructivist Pedagogical Beliefs	CPB1	0.829	CPB1	0.83
	CPB2	0.871	CPB2	0.872
	CPB3	0.816	CPB3	0.811
	CPB4	0.727	CPB4	0.724
	CPB5	0.821	CPB5	0.828
Traditional Pedagogical Beliefs	TPB1	0.715	TPB1	0.709
	TPB2	0.891	TPB2	0.936
	TPB3	0.557	-	-
	TPB4	0.738	TPB4	0.7
	TPB5	0.574	-	-
Perceived Ease of Use	PEOU1	0.68	PEOU1	0.685
	PEOU2	0.678	PEOU2	0.678
	PEOU3	0.88	PEOU3	0.879
	PEOU4	0.875	PEOU4	0.874
	PEOU5	0.892	PEOU5	0.893
Perceived Usefulness	PU1	0.806	PU1	0.798
	PU2	0.921	PU2	0.921
	PU3	0.925	PU3	0.927
	PU4	0.856	PU4	0.858
	PU5	0.903	PU5	0.907

LMS usage	US1	0.793	US1	0.875
	US2	0.576	-	-
	US3	0.809	US3	0.852
	US4	0.53	-	-
	US5	0.679	US5	0.623

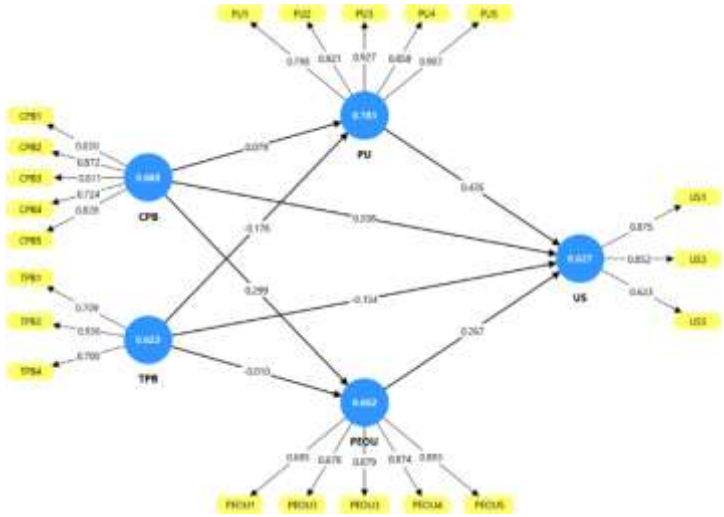

Figure 4. Stage-two Measurement Model Testing Results

3.1.2. Discriminant Validity

The Discriminant Validity Testing stage in this study can be conducted by examining the criteria of the Fornell-Larcker Criterion, Cross-Loading, and the Heterotrait-Monotrait Ratio. The results in Table 4 show that the square root value of AVE for all variables (CPB, PEOU, PU, TPB, and US) is greater than the correlation value between any other pair of variables. This means that each construct is stronger in explaining its own indicators, according to the Fornell-Larcker criteria. In Table 5, all indicators have the highest loading on their respective original constructs, indicating that each indicator accurately measures the intended construct. This indicates that there is no problem with discriminant validity based on the Cross Loading test. In addition, the HTMT results in Table 6 show that all ratio values are below 0.9, indicating no overlap between constructs and thus meeting the criterion of discriminant validity. Overall, the model is valid for further testing. PU and PEOU proved to be the primary factors that positively influence the US, while TPB showed a weaker influence and may require further examination.

Table 4. Fornell-Larcker Criterion

	CPB	**PEOU**	**PU**	**TPB**	**US**
CPB	0.814				
PEOU	0.301	0.808			
PU	0.099	0.494	0.884		
TPB	-0.112	-0.043	-0.185	0.789	
US	0.348	0.551	0.616	-0.269	0.792

Table 5. Cross Loading

	CPB	PEOU	PU	TPB	US
CPB1	0.83	0.305	0.113	-0.121	0.389
CPB2	0.872	0.255	0.17	-0.078	0.283
CPB3	0.811	0.218	0.095	-0.05	0.191
CPB4	0.724	0.247	-0.088	-0.124	0.254
CPB5	0.828	0.156	0.075	-0.065	0.234
PEOU1	0.282	0.685	0.174	-0.033	0.176
PEOU2	0.289	0.678	0.282	-0.069	0.326
PEOU3	0.202	0.879	0.542	0.046	0.609
PEOU4	0.25	0.874	0.488	-0.127	0.533
PEOU5	0.246	0.893	0.377	-0.004	0.429
PU1	0.057	0.511	0.798	-0.178	0.503
PU2	0.073	0.401	0.921	-0.22	0.564
PU3	0.124	0.468	0.927	-0.184	0.616
PU4	0.061	0.394	0.858	-0.127	0.511
PU5	0.117	0.409	0.907	-0.096	0.51
TPB1	0.114	-0.057	-0.05	0.709	-0.172
TPB2	-0.177	-0.031	-0.227	0.936	-0.283
TPB4	-0.124	-0.022	-0.1	0.7	-0.141
US1	0.295	0.512	0.634	-0.227	0.875
US3	0.366	0.421	0.444	-0.31	0.852
US5	0.125	0.362	0.334	-0.056	0.623

Table 6. Heterotrait-Monotrait Ratio

	CPB	PEOU	PU	TPB	US
CPB					
PEOU	0.348				
PU	0.154	0.515			
TPB	0.223	0.11	0.204		
US	0.41	0.651	0.734	0.345	

3.1.3. Reliability Test

Reliability testing is used to determine whether the data shows the level of accuracy in this study. The variable under study will be declared reliable when the variable has a Cronbach's alpha (CA) and Composite Reliability (CR) value greater than 0.70 and an AVE above 0.50.

Table 7. Reliability Test

	CA	rho_A	CR	AVE
CPB	0.874	0.905	0.908	0.663
PEOU	0.867	0.903	0.902	0.652
PU	0.929	0.936	0.947	0.781
TPB	0.702	0.904	0.829	0.623

US	0.701	0.765	0.831	0.627

Based on the results in Table 7 above, all research variables meet the criteria of reliability and convergent validity well. The CA value for all variables is above 0.70 (CPB=0.874; PEOU=0.867; PU=0.929; TPB=0.702; US=0.701), The CR values exceed 0.70 (CPB=0.908; PEOU=0.902; PU=0.947; TPB=0.829; US=0.831), and Average Variance Extracted (AVE) is above 0.50 (CPB=0.663; PEOU=0.652; PU=0.781; TPB=0.623; US=0.627). These results indicate that all variables in this study exhibit strong internal consistency and account for more than 50% of the variance in their indicators. Therefore, it can be concluded that the measurement of all variables in this study is reliable and valid.

3.2. Structural Model Evaluation (Inner Model)

In testing the structural model or hypothesis, a significance value for the path coefficient is calculated using the PLS Bootstrapping.

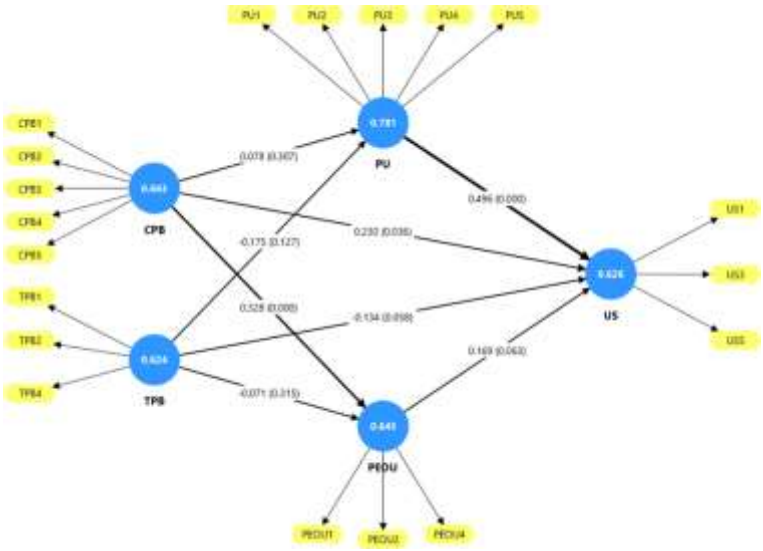

Figure 5. PLS Bootstraping Structural Model Test Results

Table 8. Hypothesis Testing Results

	T Statistics	P Values	Significant
CPB -> PU	0.505	0.307	NO
CPB-> US	1.805	0.036	YES
CPB-> PEOU	3.407	0.000	YES
TPB-> PU	1.142	0.127	NO
TPB-> US	1.573	0.058	NO
TPB-> PEOU	0.481	0.315	NO
PU -> US	4.543	0.000	YES
PEOU -> US	1.527	0.063	NO

a. H1 tested the significant relationship between CPB and PU. The test results show that this relationship is not significant (T = 0.505, P-value of 0.307). This suggests that although lecturers adopt a constructivist approach to learning, it does not necessarily lead them to feel that the LMS is useful. Thus, the first hypothesis was rejected.
b. H2 tested the significant relationship between CPB and the US. The results showed a significant relationship (T = 1.805, p = 0.036). This means that lecturers with constructivist

beliefs are more likely to actively use the LMS in the learning process. An open attitude towards technology has an impact on the high intensity of LMS use. Therefore, the second hypothesis is accepted.

c. H3 tested the significant relationship between CPB and PEOU. The analysis results revealed a significant relationship (T = 3.407, $p < 0.001$). This indicates that lecturers with constructivist attitudes tend to find the LMS easy to use, as they are used to interacting with technology and modern learning approaches. Hence, the third hypothesis was accepted.
d. H4 tested the significant relationship between TPB and PU. With a T-statistic of 1.142 and a *p*-value of 0.127, the results show that there is no significant relationship. This means that lecturers who still adhere to traditional teaching principles do not consider the LMS a useful tool. Thus, the fourth hypothesis was rejected.
e. H5 tested the significant relationship between TPB and US. The T-statistic value of 1.573 and the *p*-value of 0.058 indicate that, although close to significance, the relationship is still below the acceptable threshold. Thus, trust in the traditional approach is insufficient to encourage the active use of the LMS. The fifth hypothesis was rejected.
f. H6 tested the significant relationship between TPB and PEOU. The test results showed an insignificant relationship, with a T-statistic of 0.481 and a *p*-value of 0.315. This means that the perceived ease of use of the LMS is not influenced by beliefs in traditional teaching. Lecturers with traditional approaches often find the LMS difficult to use. Thus, the sixth hypothesis was rejected.
g. H7 tested the significant relationship between PU and US. The test results showed a highly significant relationship (T = 4.543, $p = 0.000$). This suggests that lecturers who perceive tangible benefits from the LMS are more likely to use it actively in teaching. Hence, the seventh hypothesis was accepted.
h. H8 tested the significant relationship between PEOU and US. The T-statistic value of 1.527 and the *p*-value of 0.063 indicate that the relationship is not significant. This means that ease of use alone is not enough to encourage lecturers to use the LMS actively. Therefore, the eighth hypothesis is rejected.

The results revealed that TPB has no significant influence on the three target variables (PEOU, PU, and US), indicating that lecturers with a traditional pedagogical orientation are not encouraged to actively use the LMS. On the other hand, discriminant validity results revealed that the correlation between TPB and PU, PEOU, and US was negative. This indicates that TPB is a barrier to the use of LMS. The stronger the traditional paradigm, i.e., the traditional learning process centered on the transmission of knowledge through lectures (lecturer-centered), the lower the value of usefulness and ease of using LMS. These findings are consistent with several previous studies that concluded that the traditional paradigm is a barrier to e-learning adoption [44], [45]. In higher education institutions with an academic culture that revolves around the traditional paradigm, e-learning usage tends to be low.

CPB has a significant influence on PEOU and the US, but not on PU. This means that constructivist pedagogical beliefs can increase the perceived ease and intensity of LMS use, but not certainly make lecturers feel that the LMS is truly useful. Although lecturers are open to technology and adopt a constructivist approach, they may not immediately perceive the LMS as a significant tool in the learning process. Lecturers with an open constructivist view tend to adapt easily to technology, in this case, the LMS. However, even though the LMS is easy to use, lecturers may not necessarily see the benefits of the LMS in terms of learning performance or outcomes. This may indicate that the LMS is still functioning primarily as an administrative tool, rather than a pedagogical tool that enhances student interaction and critical thinking skills, and is used only as a medium for uploading teaching materials and assignments/tests. This explains the CPB results that influence the US. LMS is used not because it has practical benefits, but as a means of creating a technology-based learning environment.

Additionally, the analysis results showing that CPB has no effect on PU confirm that a constructivist mindset does not automatically make LMS useful. In the context of higher education in Eastern Indonesia, less-than-ideal digital infrastructure conditions, such as unstable

internet access, limited bandwidth, and limited devices, may affect the usefulness of the LMS. If the LMS does not run smoothly because it cannot be accessed from remote areas, then the perception of 'usefulness' will be low. Similarly, a conclusion can be drawn from the insignificant results of PEOU and LMS usage when PU was shown to have a significant influence on LMS usage. This confirms that perceived usefulness remains a key driver in technology adoption, rather than ease of operation. In Eastern Indonesia, this makes sense when technological infrastructure becomes a technical obstacle that makes the aspect of 'ease' relative.

One of the findings in this study is that the effect of PEOU on actual LMS usage was not statistically significant. The p-value of 0.063 indicates a near-significant result. This can be interpreted as a marginal effect, rather than a complete absence of relationship between PEOU and US. Compared to the relationship between PU and US, this makes sense when the technology has been in use for a long time, users are no longer in the initial adoption phase, and ease of use is no longer the main driver determining usage. In line with the findings of [46], [47]. Therefore, it can be concluded that the rejection of H8 may indicate that the sample in this study was in the post-adoption phase of LMS. At this stage, the continued use of LMS is likely mediated by other variables, such as persistent intent to use and satisfaction [47].

3.3. Goodness of Fit Model

Furthermore, to determine the suitability or fit of an empirical model, goodness-of-fit model testing is carried out by comparing it with the theoretical model. The main purpose of testing this model is to measure the accuracy of the regression function in estimating the actual value statistically.

Table 9. Goodness of Fit Model

	Saturated model	Estimated model
SRMR	0.093	0.117
d_ULS	1.649	2.607
d_G	0.718	0.763
Chi-square	249.208	253.206
NFI	0.691	0.686

Table 9 above shows the goodness-of-fit test results for the Saturated model and the Estimated model. Both models have relatively similar index values, with Standardized Root Mean Square Residual (SRMR) of 0.093 for the Saturated model and 0.117 for the Estimated model. The d_ULS value is 1.649 in the Saturated model and 2.607 in the Estimated model, while d_G has a value of 0.718 in the Saturated model and 0.763 in the Estimated model. For the Chi-square test, the Saturated model yielded 249.208, and the Estimated model 253.206. Meanwhile, the Normed Fit Index (NFI) reached 0.691 in the Saturated model and 0.686 in the Estimated model. Overall, these values indicate that the Goodness of Fit in Table 10 is acceptable for the relationship between the model and the observed data.

4. CONCLUSION

This study demonstrates that university lecturers' use of LMS is not determined solely by the system's ease of use, but rather depends on how much 'practical usefulness' they experience through the system. Particularly at private universities in Eastern Indonesia, where technological infrastructure remains insufficient, professors are more sensitive to how 'helpful' the system actually is. Lecturers holding CPB tend to handle LMS relatively easily, but this does not necessarily mean they highly value the system's 'usefulness'. That is, while philosophically supporting student-centered learning, they often fail to fully appreciate the LMS's actual educational value due to technical constraints or unstable network environments.

Nevertheless, constructivist beliefs have a direct influence on LMS usage. Even if lecturers do not consider the LMS perfect, they tend to utilize it as a tool to practice their teaching philosophy. These results suggest that, within the context of Eastern Indonesia, 'instructor values and perceptions' drive the adoption of learning technology more strongly than technical factors.

It is recommended that higher education institution in Eastern Indonesia to improve lecturer training and provide easy-to-understand LMS guides, especially for lecturers with traditional teaching approaches. LMS should be used not only as a medium for materials distribution. Thus, training can be centered to optimize advance LMS features, such as peer-assessment, discussion forums, interactive online quizzes and exams, multimedia support, mobile accessibility, and an integrated grading system, that contribute to constructivist pedagogy, and at the same time reinforce LMS usability.

Additionally, internal LMS development and regular evaluation is recommended to ensure its long-term use. Quick and accessible technical support should be provided to minimize bottlenecks. For future research, it is recommended to involve students and support staff and consider additional variables such as motivation, and demographic factors to gain a more comprehensive understanding of LMS usage in higher education.

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APPENDIX – THE INSTRUMENT

Constructivist Pedagogical Beliefs Keyakinan Pedagogis Konstruktivis	CPB1	Learning means students have full opportunities to explore, discuss and express their ideas. Belajar berarti mahasiswa memiliki kesempatan penuh untuk mengeksplorasi, berdiskusi, dan mengekspresikan ide-ide mereka.
	CPB2	Every student is unique or special and deserves an education tailored to his or her particular needs. Setiap mahasiswa adalah unik atau istimewa dan berhak mendapatkan pendidikan yang disesuaikan dengan kebutuhannya
	CPB3	It is important that a teacher understands the feelings of the students. Penting bagi seorang dosen untuk memahami perasaan mahasiswa.
	CPB4	Good teachers always encourage students to think for answers themselves. Dosen yang baik selalu mendorong mahasiswa untuk berpikir untuk menemukan jawabannya sendiri.
	CPB5	In good classrooms, there is a democratic and free atmosphere which stimulates students to think and interact. Dalam kelas yang baik, mahasiswa dapat merasakan kebebasan dalam berpendapat dan berdiskusi secara terbuka sehingga merangsang mereka untuk berpikir dan berinteraksi.
Traditional Pedagogical Beliefs (Keyakinan Pedagosis Tradisional)	TPB1	During the class, it is important to keep students confined to the textbooks and the desks. Selama di kelas, penting untuk membuat mahasiswa tetap fokus pada buku teks dan tetap duduk di tempat duduk mereka masing-masing.
	TPB2	Learning to teach simply means practicing the ideas from lecturers without questioning them. Belajar mengajar berarti mempraktikkan ide-ide dari dosen tanpa mempertanyakannya.
	TPB3	Teaching is simply telling, presenting, or explaining the subject matter. Mengajar hanya sekedar menyampaikan, mempresentasikan, atau menjelaskan materi pelajaran.
	TPB4	Good teaching occurs when there is mostly teacher talk in the classroom. Pengajaran yang baik adalah ketika sebagian besar waktu digunakan oleh dosen untuk berbicara dalam kelas.

	TPB5	Teaching is to provide students with accurate and complete knowledge rather than encourage them to discover it. Mengajar adalah memberikan pengetahuan yang akurat dan lengkap kepada mahasiswa, bukan mendorong mereka untuk menemukannya.
Perceived Usefulness (Kegunaan yang Dirasakan)	PU1	Using LMS for work enables me to accomplish tasks more quickly. Menggunakan LMS untuk bekerja memungkinkan saya untuk menyelesaikan tugas dengan lebih cepat.
	PU2	Using LMS for work improves my job performance. Menggunakan LMS untuk bekerja meningkatkan kinerja pekerjaan saya.
	PU3	Using LMS for work increases my job productivity. Menggunakan LMS untuk bekerja meningkatkan produktivitas kerja saya
	PU4	Using LMS for work enhances my effectiveness. Menggunakan LMS untuk bekerja meningkatkan efektivitas kerja saya.
	PU5	LMS for work is useful in my job. LMS untuk pekerjaan berguna dalam pekerjaan saya.
Perceived Ease of Use (Persepsi Kemudahan Penggunaan)	PEOU1	Learning how to use LMS is easy. Mempelajari cara menggunakan LMS itu mudah.
	PEOU2	My interaction with LMS is clear and understandable. Interaksi saya dengan LMS jelas dan mudah dimengerti
	PEOU3	I find LMS to be very flexible. Saya merasa LMS sangat fleksibel
	PEOU4	I find it easy to get LMS to do the work I want it to do. Saya merasa mudah untuk membuat LMS melakukan pekerjaan yang saya inginkan.
	PEOU5	Overall, I find that LMS is easy to use. Secara keseluruhan, saya merasa LMS mudah digunakan.
LMS Usage	US1	Currently, I use LMS in my teaching and learning process. Saat ini, saya menggunakan LMS dalam proses belajar mengajar saya.
	US2	I use LMS more than any other educational technologies. Saya menggunakan LMS lebih banyak daripada teknologi pendidikan lainnya.
	US3	I use LMS more than any other educational technologies. Saya menggunakan LMS lebih banyak daripada teknologi pendidikan lainnya.
	US4	I use assessment tools (quiz or test) inside LMS. Saya menggunakan alat penilaian (kuis atau tes) di dalam LMS.
	US5	I use communication tools (discussion) inside LMS. Saya menggunakan alat komunikasi (diskusi) di dalam LMS