Online Learning Acceptance in Higher Education during Covid-19 Pandemic: An Indonesian Case Study

**Abstract.** Distance education using e-learning is a solution to pandemic condition. However, in the implementation, some barriers influence students' psychological needs. CeLOE LMS is an e-learning platform to support distance or online education for all Telkom University students. The aim of this study is to analyze the influencing factors of user acceptance behavior and attitudes using the Technology Acceptance Model (TAM). This study using a quantitative way to measure the user acceptance of CELOE LMS during online learning at Telkom University. A total of 175 college students participated in this study. This study using five variables with 24 indicators that influence user acceptance attitudes and behavior, namely Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Use (ATU), Behavioral Intention to Use (BI), and Actual System Use (AU) which analyzed using PLS-SEM tools. The results showed that all six hypothesis (H1-H6) were positive and significant. Hypotheses 3 which PEOU variable influencing ATU variable has a highest hypothesis test result with score is 0.671. While Hypotheses 5, which PU variable influencing ATU variable has the lowest hypothesis test result with score is 0.279.

*Keywords:* TAM; Online Learning; Learning Management System; Higher Education; PLS-SEM

**1. Introduction**

The new instance of the pneumonia virus, SARS-CoV-2, also known as COVID-19, was initially reported in China on December 31, 2019, and has since spread to over 222 countries, including Indonesia (WHO, 2020). Indonesia is also attempting to contain the spread of the virus by limiting people's productive activities through restrictions such as working from home, studying from home, and praying at home. Minister of Education and Culture, Nadiem Makarim, prevents COVID-19 from spreading by delaying mass gathering activities and substituting them with video conferencing, digital documents, and other online activities (Kemendikbud, 2020). According to a survey conducted on the implementation of *Pembelajaran Jarak Jauh* (PJJ) / distance learning during the Covid-19 pandemic in Indonesia, 70% of students and 300,000 lecturers rated the PJJ implementation as good or very good (Dikti, 2021). This data demonstrates that the limitations imposed by the Covid-19 pandemic have a fairly significant effect on the implementation of PJJ via various delivery modes (Dikti, 2021).

 The use of e-learning is the best method for overcoming educational issues, particularly in this pandemic situation. The e-learning and digital technologies implementation also can be a chance for the educational sector to improve the quality of education and contributes to the economy's continued development (Koroleva & Kuratova, 2020). Distance learning is a solution for the education sector in Indonesia to minimize the transmission of the COVID-19 virus. In e-learning, Indonesia swiftly built a distance learning approach (Nugroho, 2020). E-learning is described as teaching and learning based on media usage and relies on or partially demonstrates the educational paradigm being employed. Electronic devices can help in training, communication, interaction, and accepting new methods of understanding and constructing learning (Salloum et al., 2019).

Telkom University is one of the universities that supports this strategy by using an e-learning platform, namely CeLOE LMS, that provides learning activities to achieve the learning outcomes. Telkom University ~~has~~ had a total of 22.279 college students in 2020, taking account for 0.2 percent of all college students in Indonesia. The total number of Indonesian college students enrolled in 2020 ~~is~~ was 8.483.213 (PDDikti, 2020). Additionally, the CeLOE LMS has never been subjected to user acceptance testing. The purpose of this study is to determine user acceptance of the CeLOE LMS using a theoretical method called the Technology Acceptance Model (TAM). TAM is an adaptation of the Theory of Reasoned Action (TRA) (Suroso et al., 2017), which Davis introduced in 1986. TAM is ~~the~~ a well-known concept for explaining user attitudes toward technology (Hanif et al., 2018). TAM has evolved into a powerful tool for predicting technology acceptance (Salloum et al., 2019). Moreover, a recent systematic review concluded that implementing TAM to educational technology acceptance has demonstrated its efficacy in comparison to other theoretical models (Al-Qaysi et al., 2018). The TAM model has developed into a robust model capable of predicating the adoption of a variety of technologies (Al-Busaidi, 2013; Al-Emran et al., 2018).

Several prior studies in Indonesia have used TAM as a conceptual model to examine the acceptance of e-learning. According to Rahayu et al., (2017), this study aimed to assess student acceptability of e-learning using the TAM model using five variables. Five of the six hypotheses proposed were declared accepted, while one was declared rejected. The rejected hypothesis is perceived usefulness has an impact to behavioral intention Even if the user understands and experiences the benefits of e-learning, this does not enhance their willingness to use the system. This can occur because, even if a user believes that using e-learning will assist him in completing academic tasks, they have no interest in continuing to use it because it is mandatory (Rahayu et al., 2017). However now, distance learning method is being used due to the pandemic situation. As a result, the student was forced to enter the online system without any preparation (Patricia Aguilera-Hermida, 2020).

Salloum (2018) investigated student attitudes and acceptability of e-learning in higher education using TAM's core and extended variables. The findings of this study are all reliable indicators, indicating that student acceptance of the e-learning system is critical to its effectiveness. Another study by Ching-Ter et al., (2017) found that all item indicators are reliable and have important practical implications for educational institutions regarding university e-learning system design. TAM has been widely adopted and is quickly rising among IT researchers, according to Suroso et al., (2017). As a result, TAM can be concluded as an information technology model that has been shown to explain user acceptance of a system. The purpose of this research is to look at the elements that influence student acceptance and the impact of the CELOE LMS e-learning. The study's findings are expected to provide insight into the aspects that affect students' interest in using CELOE LMS, allowing future e-learning to be optimized.

Hypothesis Test

Path coefficient testing serves to determine the relationship between variables is positive and strong. The value of the variable relationship is said to be positive and strong if it has a path coefficient value > 0.1 (Hair et al., 2015). Then, to measure the relationship between variables is significant or not if it has a value of t statistics > t table (1.97377). The relationship between variables can be seen in Figure 3 and the result of the hypothesis test can be seen in Table 6.

**Table 6.** The Result of Hypothesis Test

| Hypothesis | Variable Relationship | T Statistics (|O/STDEV|) | Path Coefficients | Result |
| --- | --- | --- | --- | --- |
| H1 | ATU → BI | 4.841 | 0.399 | **Accepted** |
| H2 | BI → AU | 5.072 | 0.367 | **Accepted** |
| H3 | PEOU → ATU | 6.279 | 0.671 | **Accepted** |
| H4 | PEOU → PU | 14.634 | 0.486 | **Accepted** |
| H5 | PU → ATU | 3.606 | 0.279 | **Accepted** |
| H6 | PU → BI | 5.158 | 0.401 | **Accepted** |

1. **(H1): The relationship between variable Attitude Toward Using and variable Behavioral Intention to Useis positive and significant**

 The association between Attitude Toward Using and Behavioral Intention to Use variables is 4,841 > 1,97377, with path coefficients of 0.399 > 0.1, according to the t statistics. As a result, the H1 recognized as **positive and significant** association between the variables Attitude Toward Using and Behavioral Intention to Use is reported to exist. This hypothesis explains how the perception of Perceived Ease of Use on the CeLOE LMS relates to the ~~CeLOE LMS's Perceived Usefulness~~ Perceived Usefulness of CeLOE LMS. In this example, students believed that using the ~~CeLOE LMS~~ system was simple, such as the CeLOE LMS system was simple to learn, easy to access information, and the processes for using the CeLOE LMS were simple to recall and operate the menus and features. Because of the ease with which CeLOE LMS can be used, it has an impact on student work, making the lecture and learning process more effective and efficient during the COVID-19 epidemic, as well as enhancing student productivity and learning performance, making CeLOE LMS helpful for students.

1. **(H2): The relationship between variable *Behavioral Intention to Use* and variable *Actual System Use*** **is positive and significant**

 Based on a t statistic of 5.072 > 1.97377 and path coefficients of 0.671 > 0.1 for the association between Behavioral Intention to Use and Actual System Use variables. As a result, the H2 recognized as **positive and significant** association between the variables Attitude Toward Using and Behavioral Intention to Use is reported to exist. This hypothesis explains how Perceived Usefulness (usefulness) of CeLOE LMS affects Attitude Toward Using (attitude to use) CeLOE LMS. In this case, it has been established that students believe that CeLOE LMS is a useful system for ~~the~~ lecture process, studying, and completing assignments during epidemic conditions, allowing them to do work more quickly, effectively, and easily, hence increasing performance and productivity. Students will have a positive attitude with CeLOE LMS if they accept it with joy and comfort. This is because the benefits provided by the CeLOE LMS have an impact on student attitudes toward using it. When students use CeLOE LMS, they are delighted and at ease because it gives the intended benefits.

1. **(H3): The relationship between variable *Perceived Ease of Use* and variable *Attitude Toward Using*** **is positive and significant**

 The association between Perceived Ease of Use and Attitude Toward Using variables is 5.072 > 1.97377, and the path coefficients are 0.486 > 0.1, according to the t statistics. As a result, the H3 recognized as **positive and significant** association between the variables Attitude Toward Using and Behavioral Intention to Use is reported to exist. This hypothesis explains how the perceived ease of use of CeLOE LMS influences Attitude Toward Using (attitude to use) ~~in~~ CeLOE LMS. Students felt at ease using CeLOE LMS because it was easy to learn and understand, easy to get the desired information, flexible to interact directly with lecturers and other students, and the functions, menus, and features in CeLOE LMS were simple to use, making students happy and comfortable when using CeLOE LMS. When students utilize CeLOE LMS during the COVID-19 epidemic, they feel happy and at ease because it is simple to use.

1. **(H4): The relationship between variable *Perceived Ease of Use* and variable *Perceived Usefulness*** **is positive and significant**

 With a t statistic of 14,634 > 1,97377 and path coefficients of 0.367 > 0.1, the association between the variables Perceived Ease of Use and Perceived Usefulness can be seen. As a result, the H4 regarded as **positive and significant** association between the variables Perceived Ease of Use and Perceived Usefulness is reported to exist. This hypothesis outlines how the attitude toward utilizing the CeLOE LMS (Attitude Toward Using) affects the Behavioral intention to use the CeLOE LMS. Because students are happy and comfortable using CeLOE LMS during the COVID-19 pandemic, they are more likely to desire to use CeLOE LMS at any time to assist their learning process and to recommend CeLOE LMS to other students.

1. **(H5): The relationship between variable *Perceived Usefulness* and variable *Attitude Toward Using*** **is positive and significant**

 The association between Perceived Usefulness and Attitude Toward Using variables is 3.606 > 1.97377, with path coefficients 0.279 > 0.1, according to the t statistics. As a result, the H5 regarded as **positive and significant** association between the variables Perceived Ease of Use and Perceived Usefulness is reported to exist. This hypothesis shows that Behavioral Intention to Use (user behavior) ~~in~~ the CeLOE LMS affects Actual System Use (actual system use). In this scenario, it is demonstrated that students' interest in the CeLOE LMS had a significant impact on actual use, as evidenced by the frequency and length with which students used the CeLOE LMS throughout the COVID-19 epidemic. This is demonstrated by the fact that ~~students'~~ students desire to continue using CeLOE LMS leads to a high frequency and duration of the usage of CeLOE LMS, namely at least once a week on lecture days and vacations, with an average duration of 10 minutes when using CeLOE LMS.

1. **(H6):** **The relationship between variable *Perceived Usefulness* and variable *Behavioral Intention to Use*** **is positive and significant**

The t statistics of the relationship between Perceived Usefulness and Behavioral Intention to Use variables of 5.158 > 1.97377 and path coefficients of 0.401 > 0.1 can be seen in the t statistics of the relationship between Perceived Usefulness and Behavioral Intention to Use variables ~~of 5.158 > 1.97377 and path coefficients of 0.401 > 0.1.~~ As a result, the H6 regarded as **positive and significant** association between the variables Perceived Usefulness and Behavioral Intention to Use is reported to exist. This hypothesis shows that Perceived Usefulness in the CeLOE LMS has a link to Behavioral Intention to Use the CeLOE LMS. During the COVID-19 epidemic, students believed that CeLOE LMS aided them in the lecture process, studying, and completing their assignments. Students are increasingly using CeLOE LMS whenever and wherever they can.

Based on the results of data analysis and processing, it ~~was~~ can be determined that all six hypotheses were accepted positively and significantly. Nonetheless, the CeLOE team must be developed and defended to sustain the parties' stability and increase the influence of acceptance of the CeLOE LMS. Hypothesis 1 (H1), the relationship between Perceived Ease of Use and Perceived Usefulness, which is also the focus of the TAM model with path coefficients of 0.486 and T-statistics of 14.634, has the most significance in this study when evaluating the hypothesis. It means that CeLOE LMS is simple to understand, learn, and use. It is also adaptable, and it is simple to recall how to use the menus and features in CeLOE LMS. Students will gain more from an easy system when it comes to the learning process and lectures. It is also supported ~~base on~~ by the findings of interviews with the CeLOE team, Telkom University has decided that a minimum of 8 synchronous sessions using ~~the~~ Zoom, Google Meet, Microsoft Teams, or Skype platforms are required, with the remaining meetings ~~being~~ held as needed and encouraged to use the CeLOE LMS. As a result, it is critical for the CeLOE team to provide the greatest facilities for distant learning to meet the intended learning objectives. The CeLOE LMS e-learning system, which is built on Moodle, is quite comprehensive in terms of menus and features, as well as in delivering a user-friendly interface and user experience (Suppasetseree & Dennis, 2010). During the rapid transition to distance learning, the Moodle LMS has established itself as the primary mode of instruction, as evidenced by Egorov et al., (2021) ~~findings~~.

According to Bozkurt (2020) research, there have been five distinct research ~~topic’s~~ topic trends in the growth of educational technology from 1993 to 2019. From multimedia learning and instructional design in 1993, online learning and higher education integration of ICT and the full potential of educational technologies between 2010 and 2014, and data-driven, smart educational technology, big data, and learning analytics between 2015 and 2019. Indonesia's educational technology, on the other hand, has not yet reached that stage in 2021. It should be data-driven in the future, utilizing smart educational technology, big data, and learning analytics. What the CeLOE team has done so far is a first step to transform the educational technology especially in Telkom University in ~~aspect~~ the aspects of pedagogy, technology, organization and economics (Godin & Terekhova, 2021). The modern concept of integrating ICT into education (in industry, the system, and the process of knowledge transfer) illustrates digital transformation (Godin & Terekhova, 2021).

Meanwhile, hypothesis 2 (H2) argues that the association between Perceived Usefulness and Attitude Toward Using is positive and significant. However, ~~when~~ compared to other hypothesis, this hypothesis has a lower value, with a path coefficient of 0.279 and a T-statistics of 3.606. This analysis was mostly because the student respondents in this survey were in 1st and 7th semesters, respectively, and had only recently used CeLOE LMS. As a result, they are unsure if they are experiencing bad or positive feelings because of using CeLOE LMS. The findings of testing this hypothesis show that the TAM model and the investigated variables are capable of adequately explaining user attitudes and behavior toward an information system. In Asvial et al., (2021) research, which the students in junior high school in Jakarta and Tangerang participated in distance learning or e-learning as a result of parental encouragement and government regulations related to COVID-19. They were not genuinely interested in e-learning. Thus, this research propose that the Indonesian government improves middle school students' digital literacy, which includes their ability to easily pick up new technology, their motivation to learn with information and communication technology, and their willingness to use information and communication technology at work (Santoso et al., 2019), by closing the digital divide, improving teacher quality, and providing supportive facilities, prior to enacting policies that require e-learning as a curricular requirement. As we all know, many students worldwide were forced to transfer from face-to-face instruction to an online learning environment in the middle of the semester due to the COVID-19 pandemic. The student was forced to enter the online system without preparation, they have limited information processing capacity, and there is a possibility that a combination of learning modalities will cause cognitive overload, affecting their ability to learn new information sufficiently (Patricia Aguilera-Hermida, 2020).

**4. Conclusions**

In this study, we may learn about the elements that influence the acceptance of the TAM model for students using the CeLOE LMS e-learning system. The TAM model uses five key TAM variables that are relevant to the research topic, including Perceived Ease of Use, Perceived Usefulness, and Attitude Toward Using, Behavioral Intention to Use, and Actual System Use. Those are all terms that can be used to describe how a system is used. All six hypotheses of the relationship between these variables are positive and significant, according to the results of the relationship between variables in testing this hypothesis. During the COVID-19 pandemic, students ~~were~~ are claimed to have accepted the employment of CeLOE LMS in the online or online lecture process according to their attitudes and behavior. Even though all six hypothesis tests were positive, the CeLOE team must continue to develop and defend itself to retain stability and increase the acceptance of the CeLOE LMS. Due to the limitation of the first model of TAM (García Botero et al., 2018; Patricia Aguilera-Hermida, 2020), the further work is required to continue this research ~~with add~~ some external variables like a) attitude, affect, and motivation; b) social factors; c) usefulness and visibility; d) instructional attributes; e) perceived behavioral control, f) cognitive engagement, and g) system attributes that influence the adoption of technology (Kemp et al., 2019; Patricia Aguilera-Hermida, 2020). Additionally, future work may include a sample of other college students from various campuses in order to capture the generic condition of distance learning acceptance. For many people, the pandemic was life changing. Additional research is needed to determine how the lack of physical contact, the decrease in social interaction, and to determine whether changes in their environment and daily lives influence their learning process.