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Cloud-Based Learning Management: An Effective Learning during Social Distancing

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Abstract

The existence of social restrictions in the global pandemic conditions makes teaching on campus more flexible. Every campus is required to do online learning. One of the newest technologies is a cloud-based learning management system. A cloud-based education platform can help lecturers provide knowledge anywhere and anytime without worrying about the physical context. A total of 220 students are asked to fill out an online questionnaire after students have completed their studies. The results of the spread were then described and analyzed by SEM-PLS using SmartPLS 3.0. The result is effort expectancy, and information quality has a significant impact on student satisfaction. Meanwhile, student satisfaction has a significant impact on the net benefit. This research also shows that the versatility and ease of obtaining quality information, especially in terms of flexibility, convenience, and interactive learning, is a critical factor in fulfilling the net benefits of students in achieving learning outcomes in student satisfaction.

Keywords: Effort Expectancy, Information Quality, Net benefit, Satisfaction, Social Distance

1. Introduction

COVID-19 has changed the global education model. Student that used to be done with a face-to-face curriculum is now being forced to do online learning. One of the media for conducting online learning is through Learning Management System (LMS). Currently, LMS has various types ranging from paid to free, such as cloud based LMS. The cloud-based concept itself means that users who use the media can freely use the LMS media. Examples of open-source LMS are Moodle, Schoology, Udemy, and others. Each of these platforms offers different features and facilities.

The adoption of LMS has mushroomed in various parts of the world (Aldiab et al., 2019;

Alsharida et al., 2021; Altalhi, 2021; Asamoah, 2021; Fadil Persada et al., 2019; Kite et al., 2020; Nguyen, 2021; Pavlenko et al., 2020; Raza et al., 2021; Sk et al., 2021; Washington, 2019). The use of LMS, of course, refers to information technology (IT) - based learning. This is because the influence of IT currently has a significant impact, especially in terms of education (Sharma et al., 2017), the central axis of the development process of children (Tay et al., 2011), young people, and adults (N. Ain et al., 2016a; Goh et al., 2013; Sharma et al., 2017). It is recognized that online systems can provide better quality results than traditional systems. one of which is the activity of being paperless (Goh et al., 2013), which means it is excellent support for the go green movement, so, naturally, online learning is prioritized in various institutions. It is education or government (H. Lin & Hwang, 2014).

As a new approach in the world of education, e-learning can also cover the needs of the teaching and learning process to be more flexible (Lee et al., 2013). This means that both teachers and students can become learning centers, a significant movement that is difficult to reach with the traditional system. The learning process is also enjoyable because it involves the internet to use live chat sessions, online discussions, live videos, and satellite broadcasts (Lee et al., 2013). It is fully realized that things like this are the immediate needs of the world today. Almost everything is done with the help of the internet and online systems. Thus, web-based systems have become very popular (N. Ain et al., 2016a; Lee et al., 2013). This online learning adoption also includes an equally popular communication tool called the learning management system (LMS). However, in terms of its use, this LMS has requirements for it to be successfully implemented. The need for complete awareness of various stakeholders, teachers, and students opens up and gets used to using it (Goh et al., 2013). So that it will feel easy because of the intensity of use and the benefits it gets.

This research aims to see and evaluate the implementation of LMS in Indonesia, especially in the COVID-19 pandemic. Currently, the implementation of online learning has various problems. For example, internet disruptions and the quality of information from the learning lecturers to students are not evenly distributed. Annual reports issued by best colleges say that 39% of online education is better than classroom learning. Meanwhile, 35% of students say that online education is inferior to learning on campus (Best Colleges, 2021). This situation raises different levels of satisfaction with online-based learning methods. To complete the evaluation process of LMS during this pandemic, we need a theory that can cover the needs of the analysis. Various models have been used to serve as the baseline framework in evaluating the use of an LMS. Several models have been used to explain how the impact of LMS is from the perspective of the Technology Acceptance Model (TAM) (Goh et al., 2013), TAM extension, and the Unified of Acceptance and Use Technology (UTAUT) (de Smet et al., 2012; C. P. Lin & Anol, 2008) and DeLone & McLean model (Sharma et al., 2017). Of course, each of these models is used according to the needs and conditions under study. Likewise, with this research, the baseline theory used is UTAUT. UTAUT provides a more comprehensive explanation because it is oriented towards the context consumer its users when using a learning system (N. Ain et al., 2016a; Venkatesh et al., 2012).

2. Literature Review

LMS is a tool to facilitate the teaching and learning process from a traditional method to an online system (Tay et al., 2011). LMS is also software prepared for administrative work, keeping track of records, and reporting the educational process (Ramesh & Ramanathan, 2013). This tool can also be a participatory activator in learning (Olaniran, 2009; Tay et al., 2011). This means that by using LMS, there is no domination between teachers and students because they are equally active in digesting the information provided in the software. LMS could help teachers organize materials and share them easily via the internet (Martín-Blas & Serrano-Fernández, 2009). Likewise, if they want to find material, students do not need to bother opening other files because they are already integrated with the online system. It is just that it is still done online.

To measure the acceptance of the use of technology used Unified of Acceptance and Use Technology (UTAUT). UTAUT initially only focused on performance expectancy, effort expectancy,

social influence, and facilitating conditions. When a person feels that by using a specific system, he finds it easy to use it, then the level of confidence to use will be higher (Venkatesh et al., 2012). This is a turning point for effort expectancy. That is, when someone feels the opposite, he will be reluctant to use a system. Vinodh & Mathew demonstrate a significant association between effort expectancy and behavioral purpose through e-governance technologies (Vinodh & Mathew, 2012). Another support from other research can add to the literature to strengthen the relationship between effort expectancy and behavioral intention in pre-school teachers (Altalhi, 2021; Fadil Persada et al., 2019; Musyaffi et al., 2021; Raza et al., 2021). Then, effort expectancy is significant to increase student satisfaction in doing online learning (Abugabah et al., 2015; Alajmi & Alotaibi, 2020; Cody-Allen & Kishore, 2006; Musyaffi & Muna, 2021). So, it is hypothesized:

H1. Effort expectancy affects User Satisfaction.

The application of an information system in an organization refers to two things, whether the information system succeeds or fails. User Satisfaction is one of the measures used to assess the performance of information systems (Montesdioca & Maçada, 2015). User satisfaction is described as the degree to which users feel that an information system operates to provide them with the information, they need (Ives et al., 1983). we can measure user satisfaction through 3 indicators: effectiveness, efficiency, and overall satisfaction (McGill et al., 2004). Effectiveness is described as the extent to which the information system can suit the needs of students that are flexible compared to traditional methods. Meanwhile, efficiency is the level where students can get better results and efforts compared to conventional methods. While overall satisfaction explains the level of satisfaction felt by students with the use of LMS. The other criteria for the success of information systems are the system's quality (DeLone & McLean, 2003). System quality is regarded as a technical measure of a system's functionality (Fernandez et al., 2017). System quality represents the characteristics of inherent information about the system itself (DeLone & McLean, 2003). System quality is a crucial factor in improving user performance and helping users complete work faster with less time and effort (Abugabah et al., 2015). This means that the better the quality of a technology system, the better the satisfaction of using the system. The dimensions used to measure system quality are reliability, correctness, response time, and integration (integration) (Abugabah et al., 2015). System quality and information quality are two of several vital factors in improving user performance and helping users complete work faster with less time and effort (Abugabah et al., 2015). The key to success in applying information technology, especially in not lies in the technology but technology users (Akman et al., 2005; Wang & Liao, 2008).

Furthermore, several other researchers discovered that and information quality affects user satisfaction, and user satisfaction influences net benefit (N. Ain et al., 2016b; Almutairi & Subramanian, 2005; Bhattacharya et al., 2012). Meanwhile, in adopting the information system success model based on other research, information quality is proven to positively affect user satisfaction (Akman et al., 2005; Wang & Liao, 2008). Based on this explanation, the hypotheses in this study are:

H2. information quality affects user satisfaction.
H3. User satisfaction affects net benefit.

3. Methods

3.1 Population and Sampling

This study included all accounting students who had used the Cloud Based-Learning Management System (LMS) in the Accounting Information System and Accounting Information Technology class. 265 Accounting students use the census sampling method, which means that the entire population was used as research sampling. The research data were obtained through the online survey method. This survey process is carried out through a questionnaire addressed to all accounting students who have used the Learning Management System (LMS).

3.2 Instrumentation

This study's research instrument was adapted from several previous studies. Participants then use a 5-point Likert scale to pick each of the available constructs (strongly disagree, disagree, doubt, accept, and strongly agree). Each of these constructs, namely effort expectancy (Venkatesh et al., 2012), information quality (Ojo, 2017), user satisfaction (Kim et al., 2007), and net benefits (Ojo, 2017), were adapted from previous research.

3.3 Data Collection

Data collection was carried out online after accounting students attended lectures using LMS. After the data is collected, it is classified to provide an overview of the respondents' characteristics in this study. Most of this research was filled with females (77.1%) and males (22.9%). Then most students use the local LMS platform at local universities (51.9%), Schoology (52.3%), and Edmodo (16.5%).

3.4 Data Analysis

The data is analyzed using the Structural Equation Model (SEM) and Partial Least Squares (PLS). The first stage is to assess the validity and reliability of the data collected in this research through structural model analysis. For the construct to be valid and reliable, analysis and evaluation of all indicators' loading factor value must exceed 0.7 (Hair et al., 2019). Following that, data validity was assessed using CA and AVE, with recommended values of 0.7 for CA and 0.5 for AVE (Hair et al., 2019). Simultaneously, the data's reliability is assessed using CR, which has a suggested value of 0.7. The second stage, namely the structural model evaluation, aims to determine whether the built model is appropriate. Assessment of the structural model consists of the review of R Square and Effect Size. The last is to test the hypothesis.

4. Result

This study's results and discussion are based on data analysis and in-depth discussion of field facts and previous literature—the Data analysis using Partial Least Square (PLS) through SmartPLS software. PLS stages include evaluation of measurement models, evaluation of structural models, and conducting hypothesis testing. The explanation of these stages is explained as follows.

Table 1: Validity and Reliability

Variable	Item	Outer Loading	AVE	CA	CR
Effort Expectancy (X_1)	$X_{1.1}$	0.825			
	$X_{1.2}$	0.833	0.644	0.814	0.878
	$X_{1.3}$	0.829			
	$X_{1.4}$	0.716			
Information Quality (X_2)	$X_{2.1}$	0.816			
	$X_{2.2}$	0.815			
	$X_{2.3}$	0.793	0.666	0.874	0.909
	$X_{2.4}$	0.847			
	$X_{2.5}$	0.808			
User Satisfaction (Y)	Y_1	0.847			
	Y_2	0.826			
	Y_3	0.828	0.697	0.891	0.920
	Y_4	0.845			
	Y_5	0.828			

Variable	Item	Outer Loading	AVE	CA	CR
Net Benefit (Z)	Z1	0.756	0.626	0.850	0.893
	Z2	0.818			
	Z3	0.846			
	Z4	0.709			
	Z5	0.817			

As a result, both metrics are in line with Hair et al recommendations. Cronbach alpha (CA), Composite Reliability (CR), and Average Variance Extracted (AVE) can also be used to assess the validity and reliability of data (Hair et al., 2019). CA and AVE are used to assess data validity, with suggested values of 0.7 for CA and 0.5 for AVE. at the same time, the reliability of the data uses CR with a recommended value of 0.7. Based on table 1 above, the average AVE value is above the recommended value, which is 0.5. At the same time, the CA value is above the recommended value of 0.7. Thus, if we look at the evaluation of AVE and CA's values, all the variables in this study are valid. Meanwhile, the CR value for the variable Effort expectancy (X1), Information Quality (X2), Net Benefit (Z), and User Satisfaction (Y) has a value of 0.7, exceeding the recommended value. Thus, all these variables are reliable.

After evaluating the data's validity and reliability, the next step is to evaluate the structural model. Evaluation of the structural model aims to determine whether the model built is appropriate. R Square, Reliability of Prediction, and Effect Size are all used to evaluate the structural model. The first is to evaluate the R square. R Square aims to determine how much influence together between variables. The following is the value of R Square as shown in table 2 below:

Table 2: R Square

	R Square	R Square Adjusted
Net Benefit (Z)	0.537	0.535
User Satisfation (Y)	0.626	0.623

Based on table 2, the R square value in the net benefit (Z) variable is 0.537. This shows that there is a joint influence between the variable ef-fort expectancy (X1), Information Quality (X2), and user satisfaction (Y) of 0.537 or 53.7%. Meanwhile, the user satisfaction (Y) variable has an R Square value of 0.626. This means a joint influence of the effort expectancy (X1) and Information Quality (X2) variables on user satisfaction of 0.626 or 62.6%.

After evaluating R Square, the next step is to evaluate the f square. F square functions to see whether the variable's predictor has a solid or weak level of closeness. The value of f square in this study is presented in table 3 below.

Table 3: f Square

	Net Benefit (Z)	User Satisfaction (Y)
Effort Expectancy (X1)		
Information Quality (X2)		
Net Benefit (Z)	0.537	0.535
User Satisfation (Y)	0.626	0.623

Table 3 above shows the f square value for each variable. The highest f square value is in the user satisfaction variable with the net benefit, which is equal to 1.158. This means that student satisfaction with the benefits obtained when using the LMS is categorized as very large. Meanwhile, the quality of information has a significant impact on student satisfaction, namely 0.833. This means that the model has a significant influence on the viewpoint of the structural model. Meanwhile, effort expectancy has a low structural relationship with student satisfaction in using LMS. Thus, the structural relationship

is categorized as low.

Table 4: Hypothesis Testing

Hyhothesis	Original Sample (O)	p-values	Decision
Effort expectancy → User satisfaction	.192	.000	Accepted
Information Quality → User satisfaction	.669	.000	Accepted
User Satisfaction → Net Benefit	.732	.000	Accepted

Next is to evaluate the proposed hypothesis. Hypothesis evaluation is carried out to determine whether the hypothesis formulated at the beginning of the study follows the results in the field. The way to determine whether the hypothesis is accepted or rejected is to compare the p-value in the PLS output with the predetermined error rate (5%). When the p-value is smaller than the error level, it means that the hypothesis is accepted, or in other words, it has a significant relationship or influence. Based on table 5 below, effort expectancy (p-value, 0.000) and information quality (p-value, 0.000) have a significant positive effect of 19.2% and 66, .9% on user satisfaction. Meanwhile, user satisfaction (p-value, 0.000) has a significant positive impact on Net Benefit of 73.2%. Thus, all the hypotheses proposed in this study are accepted.

5. Discussion

The application of social distancing forces lecturers and students to adopt online learning. Of course, this is an uneven thing for both lecturers and students to do online learning. So, effort expectancy is significant to increase student satisfaction in doing online learning (Abugabah et al., 2015; Alajmi & Alotaibi, 2020; Cody-Allen & Kishore, 2006). The authors found that the problem of internet connection was a significant obstacle for students. This is because to access content in the LMS, and students must use an internet network with a large quota. In using the LMS, students learn independently by following the instructions in the LMS. To access content containing videos, upload assignments, conduct conference meetings, and access question data banks, of course, requires a large internet quota. This is a problem because almost everyone, including students, is economically impacted by social distancing. As said by previous researchers, it is true where easy access is an essential factor in the adoption of new technology (N. U. Ain et al., 2016; Dwivedi et al., 2020; Gunasinghe et al., 2019; C. P. Lin & Anol, 2008; Musyaffi & Kayati, 2020; Rosnidah et al., 2019; Shaw & Sergueeva, 2019). Student achievement towards an excellent final score is one of these benchmarks. By using LMS, students voluntarily study lecture material with great enthusiasm. Coupled with an attractive and easy-to-understand learning design, it adds to the student's broader scope. So that the impact is that the average student is satisfied with the LMS currently used.

Information quality refers to the quality standards that users receive in receiving the information they get. Accounting students see the quality of LMS information regarding how this information is helpful to them. Based on this study results, students in the accounting department agree that LMS can help them understand learning in accounting in terms of speed, function, and quality of the information produced. However, this study's findings indicate that the information quality factor, especially the interest in content, is one of the most significant factors in increasing and decreasing the satisfaction of accounting students. In line with these research results, the research results show that the factor of interest in the subjects that students can teach is one of the most significant factors student satisfaction (Hussein et al., 2020a). The literacy problem of lecturers who do not understand LMS, especially in making exciting content, is one of the inhibiting factors. The results of this research indicate that there are only a few students who do not understand learning using LMS. Factors such as independent learning are one of the causes as well. The results of this study are following several previous studies where information quality affects user satisfaction (Aldholay et al., 2019; Hussein et al., 2020b; Musyaffi, 2020; Yuce et al., 2019) especially in the quality

of online learning which has flexibility, convenience, and interactive learning. The better the satisfaction is felt, the better the net benefit that the students feel. Students who are satisfied with the LMS features and functions have a positive impact, namely an increase in student understanding of the material that has been studied.

6. Conclusion

This research is a form of development of the UTAUT model and the Information System Success Model with the focus on the expectations of the LMS efforts implemented by universities. The results of this study prove that the factors that influence students in increasing effective performance using LMS are user satisfaction, information quality, and business expectations. The results of this research are significant so that lecturers can provide insight into student learning evaluation. The results of this research indicate the dominance of the quality of information produced by LMS. In other words, the learning arrangements and flow in the LMS are essential components so that accounting students can achieve the specified learning outcomes.

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