Technology Adoption Model on Higher Education Learning Environments

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ARTICLE INFORMATION

ABSTRACT

This study examines technology adoption in higher education university learning environments in the Special Region of Yogyakarta. The object of this research is the e-learning system innovation in universities in the Yogyakarta region. This study focuses on the individual internal characteristics that influence e-learning adoption. This research's internal factors are user motivation, perceived Ease of use, trust, and technology readiness. This survey is a type of survey in university students, analyzing the adoption of e-learning technology using student respondents. While the method used is quantitative. This survey uses a questionnaire as a tool to collect data. The number of samples in this study is 150 students. Analyze the data using a structural model with Partial Least Square. This research indicates that the e-learning adoption model in the university environment, influenced by trust, motivation, perceived ease of use, and perceived technology readiness, is acceptable. The results of this study indicate that all proposed hypotheses can be accepted.

Keywords: E-Learning Adoption, Motivation, Perceived Ease of Use, Technological Readiness, Trust

JEL Classification: I20, I25, I29

INTRODUCTION

This research uses the Theory of Innovation adoption from Rogers (2003) and the Technology Acceptance Model (Davis, 1989) to examine the adoption of online learning systems in a digital environment. In particular, this research focuses on measuring the adoption of technological innovations, namely e-learning in a digital learning environment. Learning Environment concentrate more on the learning climate and offices accommodated for both teachers and students. The Learning Environment contains a learning management system, intelligent learning, technical infrastructure, navigation, and access. In the Higher Education environment, introducing technologies like a Virtual Learning Environment (V.L.) and Social-Media (S.M.) attract research attention. Research on learning environments aims to build a technology adoption theory, exploring the determinants of adoption and utilization of digital tools by students and staff in higher education (Khechine et al. al., 2020). García-Martín & García-Sánchez (2018) show that V.L. is accepted as a new culture in higher education, further research explores the consequences of digital learning. In this recent stream of research, the positive impact of V.L. use was recognized. Cantabella et al. (2018) and Gunuc & Kuzu (2015) use V.L. to facilitate collaborative learning, encourage student interaction with faculty, and increase student engagement. This will further look up the quality of education, improve students' learning abilities and improve their academic performance (Cantabella et al., 2018; Lacka et al., 2021). The field of education is one that has benefited from information technology (Lekopanye & Mogwe, 2014).

Many countries worldwide are doing all potential to address the resistance of technology adoption in education by providing basic briefing on technology introduction, and educators at all levels receive training, and upgrading skills (O.E.C.D., 2014). E-learning in university teaching has become the principal focus of education and human resources researchers. This postpone in adoption is becoming common and a developing concern among universities (Kanwal & Rehman, 2017). Investment in technology in an institution should be the main priority due to requiring e-learning that is increasingly familiar with digital technology (Mehta et al., 2019). Although researchers face many challenges, educational adoption innovation is interesting (Sabelli and Harris, 2015). Continuous sustainable of innovation will be achieved when the critical period is over, which means there are quite a number of independent employees (Rogers et al. 2005). Most e-learning innovations stemming from teaching practice in tertiary institutions do not reach this critical mass point (Adiyarta et al., 2018). In academics in university education, the adoption of e-learning innovations has not been successful. This is because many colleges are seeing a faster-than-expected digitization revolution on campus. The use of computer technology and the internet in university education has spurred curiosity, resistance, and resistance to information technology (Kisanga & Ireson, 2015; El-Masri & Tarhini, 2017).

This study examines the acceptance of technology adoption in the learning environment at universities in the Special Region of Yogyakarta, Indonesia, analyzing personal internal factors affecting adoption. Internal factors examined in this survey are user motivation, technological readiness, trust, and perceived ease of use. This research is urgent because, according to Serdyukov (2017), the condition of universities is still troubling due to the lack of educational foundations in the field of learning technology. In addition, teacher awareness is still low regarding the ability of e-learning technology to fix all problems faced in the classroom, both face-to-face and virtual. Research on the adoption of e-learning is urgent because, according to Abrahams (2010), the Covid-19 pandemic had radically changed the learning model, which has initially been learning done face-to-face to virtual learning (Achieng & Jagero, 2014). The shift in teaching patterns has also become more apparent with e-learning technology. (Adiyarta et al.,

2018). Many teachers and students have not fully implemented e-learning (Abrahams, 2010; Sugandini et al., 2018b). Research on technological adoptions in universities is also crucial because Many institutions are perplexed as to why some innovations are widely embraced while others are not.

According to Achieng & Jagero (2014), universities that could manage adopting and diffusion of innovations earlier have the opportunity to innovate more effectively and can more easily overcome learning challenges. In conditions of the Covid-19 pandemic, which requires the entire academic community to work from home. This research has a novelty related to the proposed model, including predictors of technological readiness, motivation, P.E.O.U., and trust in e-learning adoption. This research was also carried out when Indonesia was under attack on the Delta variant of the covid-19 pandemic that is rampant. This second wave of pandemics has led to much stricter restrictions and lockdowns. Environmental conditions like this impact the acceptance/adoption of e-learning learning models compared to all normal conditions (without a pandemic). This research is unique in situations of forced technology adoption, meaning that users are consciously forced to adopt e-learning for the continuity of the learning and education process, which is their obligation. During this pandemic, many universities in Yogyakarta were not technologically ready to adopt e-learning. The results of this study are expected to provide in-depth scientific benefits about technology adoption in conditions of limitations and compulsion.

LITERATURE REVIEW

Adoption of Information Technology in Higher Education
Rogers (2003) explain innovation as new ideas, objects, or practices, recognized as new by the target individual or community. Web-based education technologies e-learning is often regarded as an innovative project. In this domain, the theory of Rogers et al. (2005) emerged as a conceptual framework for analyzing the process of diffusion of innovations (Hoehle et al., 2015; Alone, 2017). E-learning is a technology that relies on the infrastructure of information technology. The cause, the Information and Communication Technology adoption model, helps explain the adoption of e-learning technology. Davis proposed several models that clarify and foresee user behavior to adopt the technology by Davis through T.A.M. The technology acceptance model (T.A.M.) proposes two variables to demonstrate the utilization of technology, specifically perceived ease of use and perceived usefulness (Zhu et al., 2018). T.A.M. conceptualizes perceived usefulness (P.U.) as the level clients accept that using a particular innovation will improve their performance. Perceived ease of use (P.E.O.U.) means clients accept that innovation is complimentary from mental and physical effort. (Hoehle et al., 2015). Martins and Nunes (2016) show that the technology acceptance models affect perceived ease of use, perceived usefulness, and intention to adopt e-learning technology.

Motivation and Adoption of E-Learning
Motivation is defined as internal and external forces that generate enthusiasm to pursue and persist in certain behaviors (Yilmaz, 2017). Therefore, the motive can be determined as a reason or purpose for performing a behavior or action that can express a value while influencing individual perceptions, emotions, and cognitions. This study utilizes Expectancy Theory to illustrate the disclose to adopt e-learning technology. El-Seoud et al. (2014), the expectations theory consists of two related force and valence models. According to Ansong et al (2017), the valence model portrays accomplishing the essential result. Adoption of e-learning technologies advances will in general be more fruitful when the innovation is seen to be in the wellbeing and when the innovation can bring about effective reception with sensible exertion (Chen et al., 2016). Past research conducted by Zhu et al. (2018) represent that the anticipation hypothesis oncome can

further develop user considerate concerning adoption behavior and attitudes. Research conducted by Chen et al. (2016) Apply Expectancy Theory by monitoring client attitudes towards e-learning technology and motivations for adopting e-learning technology. Chen et al., (2012); Zhu et al., (2018). give a superior arrangement that inspiration can precisely anticipate the adoption of e-learning innovation. Meriem & Al Meriouh (2020) state that the adoption of e-learning technology can also be influenced by motivation in using e-learning.

    H1: Motivation affects trust

Perceived Ease of Use and Trust
The Technology Acceptance Model assumes that technology acceptance behavior is primarily influenced by two individual trusts: ease of use and perceived usefulness. Tarhini et al. (2017) developed a Theory of Reasoned Action (T.R.A.) model as a theory of reasoned action which will be adopted by the T.A.M. model. The premise is that a person's reaction and perception of something will specify behavior and attitudes. The term P.E.O.U. refers to a person's personal belief system that technology adoption it isn't problematic or requires significant effort when utilized. Awareness of practicality and ease of use affect the settings. Decide if people aim to adopt technology (Serdyukov, 2017). Dwivedi et al. (2017) expressed that the simplicity of utilizing innovation is an indicator or forerunner of trust (passionate and social viewpoints) and aim to utilize innovation. The explanation is that the more clients think that it is not difficult to utilize new innovation, the almost certain they are to trust the innovation, and therefore, their goal to utilize it will likewise increment. Mehta et al., 2019) also prove a relationship between perceived trust, adoption of new technologies, and ease of use.

    H2: Perceived ease of use affects trust

Trust and E-Learning Adoption
Trust is a fundamental part in the reception of advancement. Trust will expand regard for information (Serdyukov, 2017). Kattoua et al., (2016) expressed that trust is identified with the reality of the wellspring of information get about advancements. Almajali & Al-Lozi (2016) said trust is a precursor variable in foreseeing technology adoption. Pham et al., (2019) likewise expressed that trust is characterized as the conviction that the technology will work as indicated by client assumptions. Along these lines, it is expected that the more clients trust technology to do their exercises, the more clients will quite often utilize it. Past research likewise upholds a positive connection among trust and technology adoption Zhu et al., (2018); and Sugandini et al. (2018a). Meriem & Al Meriouh (2020) state that the adoption of e-learning technology is partly due to the belief in the contribution of e-learning.

    H3: Trust affects e-learning adoption.

Technology Readiness (T.R.) and E-Learning Adoption
Estimation of e-learning readiness allows institutions to plan frameworks systems to match the measurement results for successful implementation. Then again, as a rule, e-learning readiness is the readiness of institutions to adopt e-learning, which means mentally and physically ready to apply e-learning technology (Markus & Cheng, 2020). According to Ling and Moi (2007), technology readiness is the inclination of people to adapt and utilize new technologies to achieve goals in the workplace. T.R. is defined as the inclination of people to utilize new technologies (Markus & Cheng, 2020). According to Parasuraman and Colby (2015), these beliefs can be classified into four categories: optimism, discomfort, innovation, and insecurity. Meanwhile, optimism and innovation can be considered affirmative/contributor dimensions (Ariani, Napitupulu, Jati, Kadar, & Syafrullah, 2018). Ariani et al. (2018) and Parasuraman & Colby (2015) different dimensions of T.R. are independent of each other and impact adoption willingness. The findings of several researchers, such as Parasuraman & Colby (2015) and Lai (2008),

show that T.R. has a beneficial impact on adoption plans and technology adoption decisions (Markus & Cheng, 2020)

H4: Technological readiness affects e-learning adoption

RESEARCH METHOD

This research was performed as a survey with an explanatory research strategy (Creswell, & Clark, 2017) and a survey sample, which is a population-based sample using a questionnaire as the primary data collection technique and an individual as the unit of analysis. The participants in this study were students from Yogyakarta's Special Region. Because there are no explicit limits on the sample taken, convenience sampling is employed as a sampling technique. In this study, 150 students were used as samples. Each concept was evaluated using a 5-point Likert scale. The Structural Model with SEM-PLS application is used in the data analysis technique (Hair et al., 2016). This research analyzes the e-learning adoption model with predictors of motivation, trust, P.E.O.U., and technology readiness and uses a learning environment as a control variable. This means that all the conditions analyzed are set in the e-learning environment. Table 1 shows how to measure some of the instruments used in the study.

Table 1. Research instruments

Variable name	Author
Motivasi	Rafique et al., (2021)
Perceived Ease of use of e-learning	Alhabeeb & Rowley (2018)
Trust	Alsaad, Mohamad & Ismail, 2017
Technology readiness (TR)	Tang et al., 2021; Parasuraman & Colby, 2015)
E-learning adoption	Cha &Kwon, 2018

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RESULTS

This study tested the e-learning adoption model with 150 student respondents. Description of research respondents can be seen in table 2.

Table 2. Descriptive Analysis Respondent

Respondent's description	%	Respondent's description	%
Age:		Length of Using E-learning	
≤19 years old	25	< 1 years	23
years old	70	> 4 years	11
>22 years old	5	1-2 years	26
Frequency of using the internet per day		>2 years	40
< 5 Hours	43	Gender	
5-10 Hours	37	Man	43
>10 Hours	20	Woman	57

Validity and Reliability Test Results
This study utilizes a structural model based on Partial Least Square. According to Hair et al. (2016), Partial Least Square analysis uses a two-step approach. The first is concerned with the outcomes of the measuring model (Outer model), while the second is concerned with the outcomes of the structural model (Inner Model). The Outer Model focuses on testing the validity and reliability of each indicator on its latent variables.

Convergent Validity is used to assess the outer model, which has a loading factor greater than 0.7. For research in the early phases of building a measurement scale, a loading value of 0.5 to 0.6 is considered sufficient. In this investigation, a loading factor limit of 0.7 will be used. The results of the Convergent Validity test are shown in Table 3.

Table 3. Convergent Validity Test Results

	Motivation		PEOU		TR		Trust		E-learning Adoption
X11	0.900	X21	0.876	X31	0.847	Z1	0.867	Y1	0.869
X12	0.895	X22	0.891	X32	0.919	Z2	0.876	Y2	0.910
X13	0.910	X23	0.880	X33	0.918	Z3	0.916	Y3	0.923
X14	0.832	X24	0.901	X34	0.889	Z4	0.886	Y4	0.917
X15	0.881	X25	0.901	X35	0.914	Z5	0.874		
X16	0.824			X36	0.884	Z6	0.857		
				X37	0.898	Z7	0.866		
				X38	0.910				

Table 3 shows that all the instruments used in the study have good convergent validity because they have a loading factor value of 0.7. The results of the discriminant validity test in this study also have an excellent factor loading value. It may be concluded that the instrument utilized in the study has satisfactory discriminant validity. Table 4 shows the findings of instrument reliability testing.

Table 4. The results of Reliability test

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
E-learning Adoption	0.926	0.927	0.948	0.819
Motivation	0.938	0.940	0.951	0.765
PEOU	0.934	0.935	0.950	0.792
TR	0.965	0.967	0.971	0.805
Trust	0.950	0.951	0.959	0.770

Table 4 shows that the research instrument reliability test has good reliability. The magnitude of the loading factor indicates reliability, and each reliability criterion has a loading factor of 0.7. (Hair et al., 2016).

Structural Models
Structural model testing is observed from the output of the SEM-PLS Algorithm. The test results of the relationship between research variables can be seen in Figure 1.

Figure 1. The E-Learning Adoption Model for Students
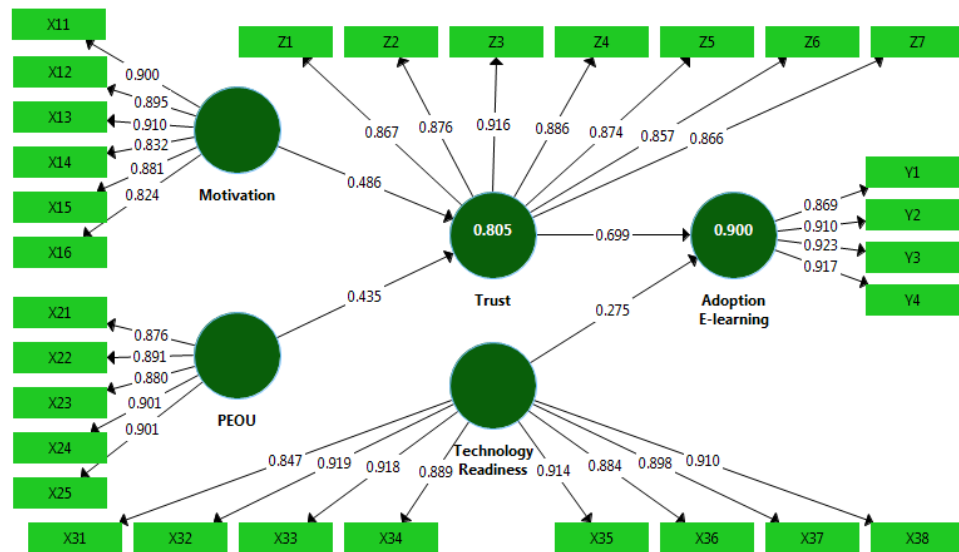
The results of the structural model test were carried out by observing the R^2 and GoF values. Based on the output of PLS 3.8, the outcomes of the structural model test of this research can be seen in table 5.

Table 5. Structural Model Fit Test Adoption of E-Learning

R^2		
Adoption E-learning	R Square	R Square Adjusted
Trust	0.900	0.898
	0.805	0.801
Predictive Relevance (Q-Square)		
$Q^2 = 1 - (1 - R_1{}^2)(1 - R_2{}^2)$ $\quad = 1 - (1 - 0.805)(1 - 0.900)$ $\quad = 1 - (0.195)(0.100)$ $\quad = 1 - 0.0195$ $\quad = 0.981$		
Goodness of Fit (GoF)		
$GoF = \sqrt{average\ AVE\ x\ average\ R^2}$ $GoF = \sqrt{0.790\ x\ 0.852}$ $GoF = \sqrt{0.673}$ $GoF = 0.820$		

Table 5 shows the value of R^2 value which is more significant than 0.6. it means that the relationship between the variables in the research model is powerful (Hair et al., 2016). The value of R^2 adjusted trust is 0.898, which means that trust has a strong relationship with motivation and P.E.O.U. E-learning adoption has an adjusted R^2 of 0.801, indicating that adoption of e-learning has a strong relationship with motivation, P.E.O.U., technology readiness, and trust. The forecast relevance of the observed values generated by the model and the predicted parameters is measured using Q-square. The Q^2 and GoF values are close to 1, indicating that the model has good predictive relevance. Based on the Q^2 and GoF calculations, the results show 0.981 and 0.820, meaning that motivation, P.E.O.U., technology readiness, and trust can predict e-

learning adoption well. Table 5 also shows that the e-learning adoption model for students in Yogyakarta has a good fit model so that this model can be accepted.

Hypothesis Testing Results
The p-value is used to determine whether the connection between the variables in this study is significant. Table 6 represent the findings of applying PLS-SEM to assess the association between variables.

Table 6. Hypothesis Testing Results

	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Hypothesis
Motivation → Trust	0.486	0.101	4.815	0.000	Supported
PEOU → Trust	0.435	0.098	4.441	0.000	Supported
TR → Adoption E-learning	0.275	0.082	3.337	0.001	Supported
Trust →Adoption E-learning	0.699	0.084	8.303	0.000	Supported

This study uses t-statistics, and the p-value is used to gauge the level of significance of the model. The significant value of the t-value used is 1.96 (level of significance 5%) and p-value <0.05. Table 6 shows that testing the effect of each research variable is significant because it has a p-value < 0.05 and a t-statistic > 1.96. This means that all proposed hypotheses are supported.

DISCUSSION

This research takes place when the world faces the second wave of covid or the so-called delta variant of covid. In Indonesia and especially the Special Region of Yogyakarta, this condition has a lot to do with changing a person's behavior and lifestyle. People have to adapt and get out of the comfort zones that they have been living in for years. Lockdowns and the need to work from home have also caused all jobs to shift online. At the beginning of this covid pandemic, most students have not adapted well to online learning. Some of the obstacles students face due to this new habit include limited internet coverage to all corners of Indonesia, which causes difficulties in accessing e-learning. Student motivation to study online has not yet been formed. Even in the early days of online learning, many students, lecturers, and the higher education community were faced with conditions of high uncertainty. All of these academics are required to adapt to online learning quickly. Campuses must immediately prepare online learning infrastructure, which is certainly not easy because it requires high costs. Students are also starting to get overwhelmed by the sharp increase in credit bills to participate in online learning.

The findings of this research indicate that, during the covid pandemic, many students in the Special Region of Yogyakarta were required to be more motivated in the success of e-learning to complete the lectures they faced. This motivation influences the level of e-learning adoption for students in the Special Region of Yogyakarta. According to Rogers (2003), students are a young group with a relatively high innovation level. This makes it easier for students to adapt to new technologies. Student motivation can be seen from success in completing academic assignments and student interest in following e-learning learning. In addition, e-learning is also perceived to facilitate relationships and communication with lecturers and classmates without being hindered by limitations of place and time. This high motivation causes trust in the e-learning system to intensify.

Motivated students will be more confident that the e-learning they adopt can provide many benefits during the Covid-19 pandemic. So, the first hypothesis, which states that motivation affects trust and e-learning adoption, is supported. The findings of this study support the expectation theory of El-Seoud et al. (2014), namely the force model and the valence model that explains the motivation to achieve an expected outcome (Meriem & Al Meriouh (2020). These findings also support Ansong et al. al. (2017); Chen et al. (2016), Zhu et al. (2018), e-learning technology adoption will be successful when the technology is regarded to have the greatest impact.

P. E.O.U. in T.A.M. theory (Davis, 1990) is a variable that affects trust. In this study, P.E.O.U. has a strong positive correlation with students' trust in e-learning. Students feel interested in e-learning because they perceive that access to e-learning programs is easy, the e-learning methods are also easy to use. It is easier for students with a relatively high level of innovation to deal with new technologies, especially if they are effortless to learn and access. The more accessible e-learning is used and understood by students, the more students trust e-learning learning programs, as a result of this the study's second hypothesis is supported.

This study carries the third hypothesis related to the relationship of trust with innovation adoption. This study's findings show that trust has a favorable impact on e-learning uptake. So, the third hypothesis is supported. This study suggests that students with a high level of education and young age rely heavily on online technology trust before they adopt it. According to the findings of this research, e-learning is believed by students to the right technology to solve solutions when they have to study from home. Then students appear because e-learning is considered to have the right technological competence for online learning, e-learning can function well in the online learning process. Students believe e-learning facilitates online learning, which is a must during the COVID-19. This research supports the T.A.M. of Davis (1989), which states that P.E.O.U. impacts the acceptance of new technologies. The findings of this study back up Mehta et al. (2019) who claim that perceived ease of use effects individual attitudes, which in turn influences whether people want to utilize technology.

Related to the perception of technology readiness in e-learning learning, this study shows that: (1) students perceive that e-learning technology contributes to the success of e-learning. (2) E-learning technology is perceived to simplify student control in carrying out daily activities. (3) students also perceive that their readiness for e-learning technology is quite good because they can use this e-learning without special assistance from others. In addition, e-learning is perceived to reduce friendship and interaction with other people directly. Students also perceive that by using e-learning, their data will be exposed in cyberspace. This research found that the readiness of e-learning technology owned by students was relatively good to upgrade the adoption of e-learning in the learning process during this pandemic. So, the fourth hypothesis in this research is supported. The results of the research support the research findings of (Markus & Cheng, 2020) and Parasuraman and Colby (2015), which state that perceptions of bribery using e-learning technology can increase the level of technology adoption for users. Although there is some discomfort in preparing e-learning technology, it is not a problem. Parasuraman & Colby (2015) and Ariani et al. (2018) show that T.R. has a beneficial impact on adoption plans and technology adoption decisions (Markus & Cheng, 2020).

CONCLUSION

This research was conducted under conditions of compulsion to deal with online learning models. According to Rogers (1995), early adopters consist of young people, have a high level of education and a high level of economic life. Rogers' opinion is slightly refuted by

the Covid-19 condition that caused the lockdown and work from home (WFH), which caused individuals to adopt new technology, namely e-learning. E-technology e-learning for most students in Yogyakarta is considered a new thing because they have never used this technology before. The adoption of e-learning technology among students has turned all students into early adopters because they are forced to use e-learning. Consistency with Rogers' opinion is only on age and level of education. Because demographically, students are the younger generation and have reasonably high education. But economically, they are not included in the individual prerequisites in the early adopter's category. So, it can be concluded that technology acceptance can be quickly adopted by individuals who have higher education and are young. Besides, the demands of the task and the availability of the only technology that must be adopted make individuals quickly adopt new technologies.

An example is the adoption of e-learning throughout the COVID-19 pandemic by students. Overall, the results of this study indicate that the e-learning adoption model proposed in this study is supported and accepted. For students in Yogyakarta, motivation, P.E.O.U., trust, and technology readiness are the driving elements in the adoption of e-learning. Trust in e-learning technology in solving the continuance of the learning process is the dominant factor influencing the adoption of e-learning.

LIMITATION
The findings of the study contribute to the significant of motivation, trust, and technology readiness factors in the COVID-19 pandemic. This is expected to increase students' willingness to continue using e-learning and make e-learning or online learning programs a success mandated by the government. Higher education managers always have to improve services in learning by providing good learning technology that can support the success of e-learning learning programs. Learning strategies during the pandemic also need to be improved and changed because most universities in Yogyakarta have not mastered online learning technology well. This research indicates that the adoption of e-learning results from the trust, perceived Ease of use, and readiness of technology in increasing e-learning adoption for students. This finding underscores the importance of trust in e-learning for learning success throughout the COVID-19. Awareness of the COVID-19 and the consequences it causes need to be well understood to students so that their learning motivation using e-learning does not decrease.

There are various limitations to this research. First, the findings of this research cannot be applied to normal conditions without the pressure of a pandemic that causes lockdowns and WFH. In relation to the need to increase the generalizability of the findings of this research, it is obligatory to conduct another meta-analysis with regard to the adoption of e-learning throughout normal times and the COVID-19. It is hoped that the analysis of two different situations can obtain a more appropriate theoretical justification, and the generalization of the findings can be expanded. Second, the setting of this research is a university in Yogyakarta known as the city of students. Further research is suggested to be conducted at universities outside Yogyakarta that are difficult to access, both internet access and access to the central government.

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CONFLICT OF INTERESTS DECLARATION
There are no conflicts of interest in the research results that we publish.

REFERENCES

Abrahams, D. (2010). Technology Adoption in Higher Education: A Framework for Identifying and Prioritising Issues and Barriers to Adoption of Instructional Technology. *Journal of Applied Research in Higher Education.* Volume 2. Number 2, pp. 33–50.

Achieng, D. O., & Jagero, J. A. (2014). Management Support in Adoption of Computer Integrated Model in Financial Forecasting International. *Journal of Academic Research in Accounting, Finance and Management Sciences.* Vol.4, No.2, April, pp. 166–175E. http://dx.doi.org/10.6007/IJARAFMS/v4- i2/837

Adiyarta, K., Napitupulu, D., Rahim, R., Abdullah, D., & Setiawan, M. I. (2018). Analysis of e-learning implementation readiness based on integrated E.L.R. model. *Journal of Physics: Conference Series.* Vol. 1007, https://iopscience.iop.org/article/10.1088/1742-6596/1007/1/012041

Alhabeeb, A., & Rowley, J. (2018). E-learning critical success factors: Comparing perspectives from academic staff and students. *Computers and Education*, 127, 1–12. https://doi.org/10.1016/j.compedu.2018.08.007

Almajali, D., & Al-Lozi, M. (2016). Determinants of the Actual Use of E-Learning Systems: An Empirical Study on Zarqa University in Jordan. *Journal of Social Sciences.* Vol. 5 (2), 1-29. DOI: https://doi.org/10.25255/jss.2016.5.2.172.200

Alone, K. (2017). Adoption of E-Learning Technologies in Education Institutions/Organizations: A Literature Review. *Asian Journal of Educational Research Research.* Vol. 5, No. 4, pp. 63-71. http://www.multidisciplinaryjournals.com/

Alsaad, A., Mohamad, R., & Ismail, N. A. (2017). The moderating role of trust in business-to-business electronic commerce (B2B E.C.) adoption. *Computers in Human Behavior.* Vol.68, pp. 157–169. https://doi.org/10.1016/J.CHB.2016.11.040

Ansong, E., Boateng, S. L., & Boateng, R. (2017). Determinants of E-Learning Adoption in Universities: Evidence from a Developing Country. *Journal of Educational Technology Systems.* Vol. 46. Issue 1. https://doi.org/10.1177/0047239516671520

Ariani, A. F., Napitupulu, D., Jati, R. K., Kadar, J. A., & Syafrullah, M. (2018, April). Testing of technology readiness index model based on exploratory factor analysis approach. *Journal of Physics: Conference Series*, 1007(1), 1-8. https://doi.org/10.1088/1742-6596/1007/1/012043

Cantabella, M., Lopez, B., Cabellero, A., & Munoz, A. (2018). Analysis and evaluation of lecturers' activity in learning management systems: Subjective and objective perceptions. *Interactive Learning Environments.* Vol. 26(7), 911–923. https://doi.org/10.1080/10494820.2017.1421561

Chen, Y., Lou, Hao., & Luo, Wenhong. (2016). Distance Learning Technology Adoption: A Motivation Perspective. *Journal of Computer Information Systems.* Vol 42. Issue 2, pp. 38-43. https://www.tandfonline.com/doi/abs/10.1080/08874417.2002.11647485

Chen, Yining., Harold T. Little Jr., Mark T., Ross, and Qin Zhao. (2012). Development and evaluation of a Web 2.0 annotation system as a learning tool in an e-learning environment. *Computers & Education.* Vol. 58 (2012) 1094–1105. https://doi.org/10.1016/j.compedu.2011.12.017

Creswell, J. W., & Clark, V. L. P. (2017). *Designing and Conducting Mixed Methods Research.* Nov. Publisher SAGE Publications Inc. Thousand Oaks, United States

Davis, F. D. (1989). Perceived usefulness, perceived Ease of use, and user acceptance. M.I.S. Quarterly, 13(3), 319-340. DOI:10.2307/249008

Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2017). Re-examining the Unified Theory of Acceptance and Use of Technology (U.T.A.U.T.): Towards a Revised Theoretical Model. *Information Systems Frontiers*, pp. 1–16. https://doi.org/10.1007/s10796-017-9774-y

El-Masri, M., & Tarhini, A. (2017). Factors affecting the adoption of e-learning systems in Qatar and U.S.A.: Extending the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). *Educational Technology Research and Development*. Vol. 65(3), pp.1–21. https://doi.org/10.1007/s11423-016-9508-8.

El-Seoud, S. M. A., Taj-Eddin, I.A.T.F., Seddiek, V., El-Khouly, M. M., & Ann-Nosseir. "E-Learning and Students' Motivation: A Research Study on the Effect of E-Learning on Higher Education". *International Journal of Emerging Technologies in Learning (iJET)*. Vol 9, No 4 http://dx.doi.org/10.3991/ijet.v9i4.3465

García-Martín, J., & García-S´anchez, J. N. (2018). The instructional effectiveness of two virtual approaches: Processes and product. *Revista de Psicodid´actica*, 23(2), 117–127. https://doi.org/10.1016/j.psicoe.2018.02.003

Gunuc, S., & Kuzu, A. (2015). Confirmation of campus-class-technology model in student engagement: A path analysis. *Computers in Human Behavior*, 48, 114–125. https://doi.org/10.1016/j.chb.2015.01.041

Hair, J. F., Jr., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM). 2ed. Sage Publications.*

Hoehle, H., Zhang, X., & Venkatesh, V. (2015). An espoused cultural perspective to understand continued intention to use mobile applications: a four-country study of mobile social media application usability. *European Journal of Information Systems*, 24(3), 337–359. https://doi.org/10.1057/ejis.2014.43

Kanwal, F., & Rehman, M. (2017). Factors Affecting E-Learning Adoption in Developing Countries–Empirical Evidence from Pakistan's Higher Education Sector. *IEEE Access*. Vol. 5. June. DOI: 10.1109/ACCESS.2017.2714379

Kattoua, Tagreed., Al-Lozi, Musa., & Alrowwad, Ala'aldin (2016). A Review of Literature on E-Learning Systems in Higher Education. *International Journal of Business Management and Economic Research* (I.J.B.M.E.R.), Vol 7(5),2016, 754-762. https://www.semanticscholar.org/

Kerby, M., Branham, K., & Mallinger, G. (2014). Consumer-based higher education: the uncaring of learning. *Journal of Higher Education Theory and Practice*. Vol. 14 No. 5, pp. 42-54, available at: www.na-businesspress.com/JHETP/KerbyMB_Web14_5_.pdf

Khechine, H., Raymond, B., & Augier, M. (2020). The adoption of social learning system: Intrinsic value in the U.T.A.U.T. model. *British Journal of Educational Technology*. Vol 51, Issue 6. Pages: 1901-2591. https://doi.org/10.1111/bjet.12905

Kisanga, D., & Ireson, G. (2015). Barriers and Strategies on Adoption of E-Learning in Tanzanian Higher Learning Institutions: Lessons for Adopters. *International Journal of Education and Development Using Information and Communication Technology*, 11(2), 126–137.

Lacka, E., Wong, T. C., & Haddoud, M. Y. (2021). Can digital technologies improve students' efficiency? Exploring the role of Virtual Learning Environment and Social Media use in Higher Education. *Computers & Education*, 163, 104099. https://doi.org/10.1016/J.COMPEDU.2020.104099

Lai, M. L. (2008). Technology readiness, internet self-efficacy, and computing experience of professional accounting students. *Campus-Wide Information Systems*, 25(1), 18-29. https://doi.org/10.1108/10650740810849061

Lekopanye, C.M., and Mogwe, A, (2014). Information Communication Technology Adoption in higher education sector of Botswana: a case study of Botho University. *I.J.A.C.S.A.,* 5(8). DOI:10.14569/IJACSA.2014.050822

Ling, L. M., & Moi, C, M. (2007). Professional students' technology readiness, prior computing experience, and acceptance of an e-Learning System. *Malaysian Accounting Review*, 2007 6(1): p. 85-99. http://dx.doi.org/10.24191/mar.v6i1.505

Markus, B., & Cheng, W. (2020). "Technology readiness: a meta-analysis of conceptualizations of the construct and its impact on technology usage". *Journal*

of the Academy of Marketing Science; New York Vol. 48, Iss. 4, (Jul 2020): 649-669. DOI:10.1007/s11747-019-00680-8

Martins, J.T. and Baptista Nunes, M. (2016). Academics' e-learning adoption in higher education institutions: a matter of trust. *The Learning Organization*, Vol. 23 No. 5, pp. 299-331. https://doi.org/10.1108/TLO-05-2015-0034

Mehta, A., Morris, N. P., Swinnerton, B., & Homer, M. (2019). The Influence of Values on e-Learning Adoption. *Computers and Education*. Vol 141, November, 103617. https://doi.org/10.1016/j.compedu.2019.103617

O.E.C.D. (2014). Measuring Innovation in Education: A New Perspective, O.E.C.D. Publishing. Paris, available at: http://dx.doi.org/10.1787/9789264215696-en

Parasuraman, A., & Colby, C. (2015). An updated and streamlined technology readiness index: TRI 2.0. *Journal of Service Research*, 18(1), 59-74. https://doi.org/10.1177/1094670514539730.

Pham, L., Limbu, Y. B., Trung, K. B., Nguyen, H. T., & Pham, H. T. (2019). Does e-learning service quality influence e-learning student satisfaction and loyalty? Evidence from Vietnam. *International Journal of Educational Technology in Higher Education*. Vol 16, 7 (https://doi.org/10.1186/s41239-019-0136-3

Rafique, G. M., Mahmood, K., Warraich, N. F., & Rehman, S. U. (2021). Readiness for Online Learning during COVID-19 pandemic: A survey of Pakistani L.I.S. students. *The Journal of Academic Librarianship*. Vol. 47(3), 102346. https://doi.org/10.1016/J.ACALIB.2021.102346

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed). New York: The Free Press.

Rogers, E. M., Medina, U. E., Rivera, M. A., & Wiley, C. J. (2005). Complex adaptive systems and the diffusion of innovations. *The Innovation Journal*, 10(3). Article 29.

Sabelli, N. H., & Harris, C. J. (2015). The role of innovation in scaling up educational innovations. In C.K. Looi& L. W. Teh (Eds.). *Scaling educational innovations* (pp. 13- 30). Singapore: Springer.

Serdyukov, P. (2017). Innovation in education: what works, what doesn't, and what to do about it? *Journal of Research in Innovative Teaching & Learning*. Vol. 10 No. 1, pp. 4-33. https://doi.org/10.1108/JRIT-10-2016-0007.

Sugandini D., Purwoko., Pambudi, A., Resmi, S., Reniati., Muafi., and Kusumawati, R. A. (2018a). The Role of Uncertainty, Perceived Ease of Use, and Perceived Usefulness Towards the Technology Adoption. *International Journal of Civil Engineering and Technology*. Vol 9, Issue 4, p. 660-669.

Sugandini, D., Feriyanto, N., Muafi., Hadioetomo & Darpito, S.H. (2018b). The Influence of Novelty Seeking Behavior and Autonomy Toward New Product Trial in The Context of E-Business Learning: The Role of Mediation of Perceived Behavioral Control. *Journal of Entrepreneurship Education*. Vol. 21, Issue 3, pp: 1-9.

Tang, Y. M., Chen, P. C., Law, K. M. Y., Wu, C. H., Lau, Y. yip, Guan, J., He, D., & Ho, G. T. S. (2021). Comparative analysis of Student's live online learning readiness during the coronavirus (COVID-19) pandemic in the higher education sector. *Computers & Education*, 168, 104211. https://doi.org/10.1016/J.COMPEDU.2021.104211

Tarhini, A., Hone, K., Liu, X., & Tarhini, T. (2017). Examining the moderating effect of individual-level cultural values on users' acceptance of E-learning in developing countries: a structural equation modeling of an extended technology acceptance model. *Interactive Learning Environments*, Volume. 25 (3). https://doi.org/10.1080/10494820-.2015.1122635

Yilmaz, R. (2017). Exploring the role of e-learning readiness on student satisfaction and motivation in flipped classroom. *Computers in Human Behavior*, 70, 251–260. https://doi.org/10.1016/J.CHB.2016.12.085

Zhu, M., Sari, A., & Lee, M. M. (2018). A systematic review of research methods and topics of the empirical MOOC literature (2014–2016). *Internet and Higher Education*, 37(January), 31–39. https://doi.org/10.1016/j.iheduc.2018.01.002