The Study of User Acceptance toward E-Learning System in Higher Education

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Abstract

E-learning is a model of delivering learning content electronically with the help of computers and multimedia. ABC University has implemented the e-learning system for two (2) years in order to improve the quality of teaching and learning process. This study aims to determine the level of user acceptance, especially from the perspective of students. In other words, this study also wants to evaluate the implementation of e-learning systems in higher education as well as identifying any factors that encourage students to use e-learning system especially in ABC University. The research method used was survey with the approach of TAM (Technology Acceptance Model) as the technology acceptance evaluation model consisting of two main factors: perceived ease of use and perceived usefulness. The results showed perceived usefulness significantly positive influence on user acceptance, while perceived ease of use did not significantly influence on user acceptance. The perceived ease of use also significantly positive influence perceived usefulness. The variance of user acceptance could be explained by two factors about 50.5%.

Keywords: User Acceptance, E-Learning, TAM, Ease of Use, Usefulness

1. Introduction

Utilization of ICT (Information and Communication Technology) in the education sector especially e-learning has been very extensive. It can be shown that it is more than a thousand institutes in 50 countries using e-learning to support learning activities [1]. The education sector needs to capitalize on advances in ICT to be able to achieve the goals effectively and efficiently [2][3]. Utilization of ICT must not be separated from the growing needs of users on the quality of learning, especially in universities. This is because the implementation of the teaching-learning process is the main business processes (core business) in education institutions. One strategy to improve the quality of learning is to harness the potential of ICT and adopt all the learning activities.

E-learning is the delivery of learning content electronically using a computer and computer-based media [4]. E-learning is defined as learning material through electronic media such as audio/video tape, CD-ROM, tv, satellite and well-connected computers via the Internet/intranet as well as stand-alone computer [5]. Despite of the definition stated that e-learning can use various electronic media but the implementation of e-learning that is most popular in the world of education is the use of learning materials using a computer and the Internet [6]. However, the actual implementation of e-learning is not just upload teaching materials or conducting instructional content, but rather to change the paradigm of the learning process. This means that the whole teaching and learning process should be done through the e-learning system. Many studies have identified numerous advantages of e-learning but in reality, not all institutions use e-learning to get results as expected [7]. Change or paradigm shift learning system began to emerge in the process of knowledge transfer. The learning process that exist today tend to be more emphasis on the process of teaching, based on the content, abstract and only for a certain group (in the process of teaching passive). As science and technology in the development of ICT in the learning process began to shift in the learning process (learning), based on the problem (case base), is contextual and not limited only to certain groups. In this learning process such learners are required to be more active by optimizing the learning resources that exist, especially through the Internet.

ABC University has implemented an e-learning system for two (years) in order to improve the quality of learning for academicians. E-learning system is an excellent program that has been implemented since 2015 and contained in the agency's strategic plan 2015-2019. In a previous study [8] on the implementation of the level of readiness of the institution of e-learning system with the model ELR (E-Learning Readiness). ELR is based on 10 factors are identified, there are 5 pieces otherwise unprepared ELR factor is factor of human resources, financial, infrastructure, innovation and institutions. Even the overall results of the assessment ELR can be said that ABC university was not ready and needed improvement (Not ready needs some works). However, it is the institution's policy to implement the e-learning system with all the limitations that exist. But until now have never measured the extent to which the user acceptance, especially students of the e-learning system is implemented. In other words, there has never been a study to determine whether the user has an interest to use e-learning, especially at the ABC university. It is important to measure the successful implementation of e-learning system based on the level of user acceptance. Thus, this study aims to assess whether the e-learning system that is implemented can be accepted the user or not. The user acceptance can predict the level of utilization of the technology in the future.

Technology acceptance model (TAM) has been widely used in various domains such as business, government to the educational use of information technology in business processes. In education, there are a number of researchers who use TAM to explain user acceptance of the technology such as e-learning, learning multimedia technology, digital libraries, e-journals, etc. For the case of e-learning, research conducted by Park (2009) on a number of university students in Korea related interest in using e-learning [10]. Research results membutikan that TAM is an appropriate theory to understand user acceptance of e-learning. Both variables, namely ease of use and usefulness significantly influence behavioral intention of students to use e-learning. TAM model is also used by researchers Al-Adwan (2013) who did a case study on the Applied Science University (ASU) in Amman [11]. The results showed that TAM can be applied as a useful theory for predicting user acceptance of the e-learning where both key factors also significantly influence the interest in using technology or e-learning system. In addition there are other studies that use TAM in the context of e-learning [6], [12, 13].

Besides e-learning, the use of TAM also be applied to the development of instructional multimedia technology [2], [14]. In research Wijaya (2016), conducted a study of user acceptance of the technology of Google (Google Clasroom) on STT Musi. The results showed perceived ease of use and perceived usefulness both individually and jointly significant effect on the use of Google Classroom [14]. In the context of digital libraries and e-journals, some researchers have also used the TAM model to examine the factors that influence user acceptance of the digital library [15, 16]. According to Thong (2004), acceptance of one's digital library technology influence the level of utilization in the future [15]. In this study will be measured against the system or user acceptance of e-learning technology at the ABC university aiming to evaluate the extent to which the use of e-learning within the organization.

2. Research Method

The method used in this study is a questionnaire-based survey in order to measure user acceptance related to e-learning system at the ABC University. The questionnaires were designed based on TAM model which distributed to total 85 respondents. The respondents were chosen by using purposive sampling based on criteria that respondents had been using e-learning system to enroll a class. Respondents in this study were students who enroll in executive class that have been using e-learning system in class over a period of two years. It is an institutional policy to implement e-learning to only executive class since the implementation of e-learning is still relatively new. Respondents were asked to provide the level of agreement against any statements regarding user acceptance of the e-learning system that consists of 4 scales: 1 = "strongly disagree", 2 = "disagree", 3 = "agree" and 4 = "strongly agree".

TAM model as mentioned previously consisted of five constructs that perceived ease of use, perceived usefulness, attitude towards the use of, interest in the use and behavior of the actual system [9]. But over time the TAM model is widely used and developed by other researchers. Gahtani (2001) modified TAM model by combining variable behavior intention to use and the actual system use into single variable namely acceptance or user acceptance [17].

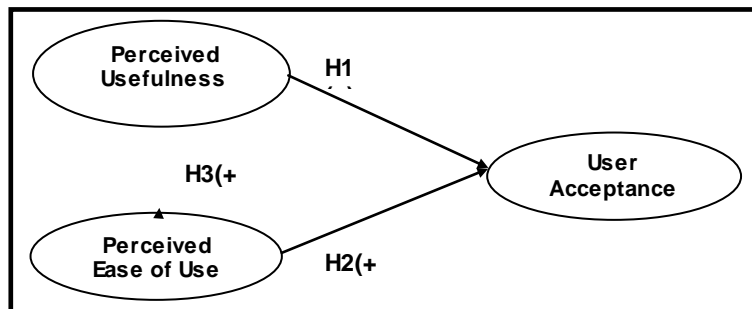Therefore in this study, TAM models that will be used following the Gahtani (2001) are as follows [17]:

Figure 1. Research Model [17]

Based on the research model above, there are several hypotheses to be tested are:
H1: Perceived usefulness has a significant positive influence on user acceptance
H2: Perceived ease of use has a significant positive influence on user acceptance
H3: Perceived ease of use has a significant positive influence on the perception of the usefulness
H4: Perceived usefulness and perceived ease of use significantly influence user acceptance together

TAM model in this study consisted of two independent variables namely the perception of the usefulness and perceived ease of use and one dependent variable namely acceptance or user acceptance. Perceived usefulness has 6 measurement indicators; perceived ease of use also consists of 6 indicators while variable user acceptance has four indicators that could be seen in Table 1 as follows:

Tabel 1. Research Instruments

No	Variable	Item
1.	Perceived Usefulness (X1)	Work more quickly (X1.1)
		Improve job performance (X1.2)
		Increase productivity (X1.3)
		Effectiveness (X1.4)
		Make job easier (X1.5)
		Useful (X1.5)
2.	Perceived Ease of Use (X2)	Easy to learn (X2.1)
		Controllable (X2.2)
		Clear & understandable (X2.3)
		Flexible (X2.4)
		Easy to become skilful (X2.5)
		Easy to use (X2.6)
3.	User Acceptance (Y)	Actual use (Y.1)
		Usage frequency (Y.2)
		User satisfaction (Y.3)
		Motivate other user (Y.4)

Testing the hypothesis in this study using multiple linear regression analysis (multiple regressions) with the help of SPSS tool to process data from respondents provide an assessment of the questionnaire in Likert scale. General equation of multiple linear regressions can be presented as follows:

$$Y = a + b1X1 + b2X2 + e \tag{1}$$

Where as:
Y = User acceptance

a = The direct link between independent and dependent variables
b1 = Coefficient of perceived usefulness toward user satisfaction
b2 = Coefficient of perceived ease of use toward user satisfaction
e = Error residue

The purpose of the multiple linear regression technique is to estimate the magnitude of parameters a, b1 and b2 as regression coefficients of the research model above [18].

3. Results & Discussion
3.1. Validity & Reliability of Instrument

In the data collection phase, a questionnaire was distributed to the 85 respondents, but only 73 questionnaires that can be used for the analysis stage. This is because there are some data incomplete or missing in the questionnaires. Thus only the data of completed questionnaires are used in this study. Before the data is processed and analyzed the results of the questionnaire, first testing the validity and reliability of the instrument to test the instruments used have been feasible and meets the specified requirements.

Results of testing the validity of the questionnaire in this study can be seen from the coefficient of validity of the instrument that is the value r_{count} (corrected item-total correlation), whereas if r_{count} greater than r_{table} indicator (statement) is said to be valid (Anwar, 2012) which can be presented in Table 2 the following:

Table 2. Result of Validity Testing

No	Item/Indicator	Corrected Item-Total Correlation (r_{count})	Result
Perceived Usefulness (X1)			
1.	Work more quickly (X1.1)	0.649	VALID
2.	Improve job performance (X1.2)	0.670	VALID
3.	Increase productivity (X1.3)	0.583	VALID
4.	Effectiveness (X1.4)	0.432	VALID
5.	Make job easier (X1.5)	0.618	VALID
6.	Useful (X1.6)	0.531	VALID
Perceived Ease of Use (X2)			
1.	Easy to learn (X2.1)	0.663	VALID
2.	Controllable (X2.2)	0.590	VALID
3.	Clear & understandable (X2.3)	0.603	VALID
4.	Flexible (X2.4)	0.649	VALID
5.	Easy to become skilful (X2.5)	0.610	VALID
6.	Easy to use (X2.6)	0.686	VALID
User Acceptance (Y)			
1.	Actual use (Y1)	0.549	VALID
2.	Usage frequency (Y2)	0.583	VALID
3.	User satisfaction (Y3)	0.721	VALID
4.	Motivate other user (Y4)	0.654	VALID

Based on the above table it can be seen that all indicators/measurement item has a value greater than rtabel rhitung (0.3). Thus the overall indicator/measurement items can be valid because it has met the requirements (> 0.3).

Testing reliability of the questionnaire in this study conducted by Cronbach alpha for each variable. According Ghozali (2002), the Cronbach alpha technique is a technique that would indicate internal consistency index is accurate, fast, and economical. The instrument is said to meet the Cronbach alpha reliability if the value is greater than 0.60. Results of testing the reliability of the questionnaire can be presented in Table 3 as follows:

Table 3. Result of Reliability Testing

No	Variables	Cronbach Alpha
1.	Perceived ease of use	0.793
2.	Perceived usefulness	0.823
3.	User Acceptance	0.828

Based on Table 3 it can be shown that each variable research is acceptance, perception of usefulness and perceived ease of use reliably meet the elements. This is evidenced by the value of Cronbach alpha reliability coefficient for the variable as user acceptance of 0.828, the perception of the usefulness of 0.823 and the perceived ease of use of 0.793. Overall, the reliability coefficient obtained is 0.916. Results Cronbach's alpha greater than 0.60 as a requirement that the instrument can be said to be reliable. Thus the instrument in this study is valid and reliable because it has met the minimum requirements.

3.2. Hypothesis Testing

Testing the hypothesis in this study was conducted by multiple linear regression analysis (multiple regression), which aims to determine the effect of two independent variables of research that perceived ease of use, and perceived usefulness of the dependent variable is the acceptance of the user acceptance.

In this study, there are four hypotheses tested: first, perceived usefulness has a significantly positive influence on user acceptance; second, perceived ease of use significantly positive influence on user acceptance; Third, perceived ease of use has a significantly positive influence on perceived usefulness and fourth, perceived usefulness and perceived ease of use have significant influence on user acceptance together.

Results of hypothesis testing presented in Table 4 in the form of individual significance test each of the variables as follows:

Table 4. Result of Hypothesis Testing (t-Test)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.553	.289		1.915	.060
	Perceived Ease of Use	.111	.158	.094	.703	.484
	Perceived Usefulness	.739	.154	.644	4.807	.000

a. Dependent Variable: User Acceptance

Based on Table 4 above can be produced by multiple linear regression equation is

$$Y = 0.553 + 0.111X1 + 0.739X2 \qquad (1)$$

Based on multiple linear regression equation, we can conclude the relationship between independent variables and the dependent variable is the variable perceived usefulness having a positive regression coefficient for 0.739. This means that the perceived usefulness is proportional to the user acceptance. In other words, if the perceived usefulness of technology is high, then user acceptance will be also high. Perceived ease of use also having a positive regression coefficient which is equal to 0.111. This means that the perceived ease of use is also directly proportional to the user acceptance. In other words, if a technology perceived is easier to use then the user acceptance will also be high for these technologies. When compared to the magnitude of the regression coefficients of both independent variables namely perceived ease of use and perceived usefulness, it could be said that perceived usefulness is more dominant than perceived ease of use on influencing the user acceptance.

Additionally in Table 4 above can shows the results of individual significance test (t-Test) that the probability of significance for the perceived usefulness is 0.000 (<0.05), and the value of t is 4,807 (> t_{table}). This means that the first hypothesis (H1) is supported in this study that perceived usefulness significantly positive influence on user acceptance. While for perceived ease of use has a probability of significance of 0.484 (> 0.05) and the value of t is 0.703 (<t_{table}). This means that the second hypothesis (H2) could not be supported that perceived ease of use had no significantly influence on user acceptance because it did not meet the requirements.

To test the third hypothesis (H3), significance test (t-Test) was conducted again in order to know how the correlation between perceived ease of use and perceived usefulness which can be presented in Table 5:

Table 5. Result of Significance Test (t-Test)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.504	.215		2.350	.022
	Perceived Ease of Use	.810	.076	.786	10.707	.000

a. Dependent Variable: Perceived Usefulness

Based on Table 5, it could be seen that the perceived ease of use significantly positive influence to perceived usefulness. This can be demonstrated with significance probability value of 0.000 (<0.05), and the regression coefficient was 0.810 (positive).

Testing the fourth hypothesis (H4) made through simultaneous significance test (F-Test) to determine whether all independent variables simultantly influence the dependent variable of user acceptance.

Table 6. Result of Significance Simultantly Test (F Testing) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.857	2	6.929	37.800	.000[b]
	Residual	12.831	70	.183		
	Total	26.688	72			

a. Dependent Variable: User Acceptance
b. Predictors: (Constant), Perceived Usefulness, Perceived Ease of Use

Based on Table 6 it could be seen that the significance probability obtained for 0.000 (<0.05), and the value of F was 37.800. It can be concluded that the fourth hypothesis (H4) could be supported in this study that perceived usefulness and perceived ease of use significantly positive influence on user acceptance together.

Then the next analysis seen is to know how many contribution of this study especially all independent variables could explain the variation of user acceptance based on t-Test could be presented in Table 7:

Table 7. Result of Determination Coefficient Testing

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.721[a]	.519	.505	.42813

Based on Table 7, the coefficient of determination obtained through the value of Adjusted R Square (R2) is approximately 0.505. This means that the variation of user acceptance could be explained by perceived usefulness and perceived ease of use amounted to 50.5%. Thus there is 49.5% of user acceptance variance that explained by other variables that have not been studied.

3.3. Significant of Study

Based on analysis done through individual significance test (t Test), it can be shown that perceived usefulness significantly positive influence on user acceptance. In other words, the system of e-learning at the ABC university deemed useful by the user in supporting and improving the quality of learning. With a system or e-learning technology, the users in this case the student could understand the material and lecturing duties effectively. E-learning also assist students in completing assignments or lectures with better quality. In addition to the e-learning system also increases the productivity of the students through the process of completion of the coursework quickly. In other words, the e-learning system that is implemented deemed useful by the user in improving teaching and learning in university. The results are consistent with the findings of other researchers in the context of e-learning [9-11], [19, 20].

Based on the results of individual significance test (t-test), perceived ease of use did not significantly influence on user acceptance. In other words, users have not considered e-learning system is easy to use (effortless) in the teaching-learning process. The results of this study contradict or not in line with the results of previous studies [9-11]. E-learning system that is implemented is yet to be clearly understood by users. This is due to the lack of campaign and training programs provided for students. Based on the information obtained, e-learning campaign charged directly to the lecturers that administer e-learning courses. The absence of a continuous training program conducted by the university as well as the un-readiness of human resources (HR) and infrastructure [8] will hinder the successful implementation of e-learning system. Though e-learning is an excellent program that has been poured into the agency's strategic plan which requires the support of adequate resources. This weakness indicates a low commitment, especially top management support or e-leardership of e-learning implementation. However, the policy that requiring learning process based on e-learning system in the university environment so the students should use the technology for supporting their study. Even students attempt to independently learn to be skilled to use it. This result becomes valuable information for management to support the various programs that have been planned related to e-learning such training program and user interface development of e-learning system, etc.

Based on the results of the analysis, perceived ease of use has positive significant influence on perceived usefulness. This result is in line with previous research in the context of e-learning [10-12]. It means that perceived usefulness consider perceived ease of use as a cost of implementation. Therefore, organizations need to support the e-learning system for more easier and convenient to use.

4. Conclusion

Based on research that has been done can be some conclusions as follows:
1. The first hypothesis (H1) could be supported from the analysis in which perceived usefulness significantly positive influence on user acceptance. It can be shown from the results of the t Test with significance of 0.000 anda regression coefficient which obtained was 0.739.
2. The second hypothesis (H2) could not supported from the analysis where perceived ease of use did not significantly influence on user acceptance. It can be shown from the results of the t Test with significance > 0.05 and regression coefficient which is equal to 0.111.
3. The third hypothesis (H3) could be supported from the analysis where the perceived ease of use significantly positive influence on perceived usefulness. It can be shown from the results of the t test with significance of 0.000 and regression coefficient which is equal to 0.810.
4. The fourth hypothesis (H4) could be supported from the analysis where perceived usefulness and ease of use of variables perceived ease of use together significantly influence on user acceptance. It can be shown from the results of the F test with probability significance of 0.000.
5. The determination coefficient obtained is 50.5% of the variation of user acceptance could be explained by two variables, namely perceived usefulness and perceived ease of use. Thus there is 49.5% variance is explained by other variables that have not been studied in this research model.
6. Suggestions of this study is needed futher research that could identified and tested other variables that influence on user acceptance of the technology in this case e-learning system. The variables in question here is not only internal (derived from the technology) but also some external (non technology) such as organizational norms, social factors, etc.

References

[1] Bhuasiri W, Xaymoungkhoun O, Zo H, Jeung RJ. Critical success factors for e-learning in developing countries: A comparative analysis between ICT experts and faculty. *Computers & Education*. 2012; 58.
[2] Syafrizal A, Ernawati, Dwiandiyanta. Penerapan Model Technology Acceptance Model (TAM) untuk Pemahaman Media Pembelajaran Berbasis Multimedia Interaktif. *Scientific Journal of Informatics*. 2015; 2(1): 9-14.
[3] Napitupulu D. Evaluasi kualitas website universitas XYZ dengan pendekatan Webqual. *Buletin Pos dan Telekomunikasi*. 2016; 14(1): 51-64.

[4]   Smaldino, Sharon E. Instructional Technology and Media for Learning. New Jersey: Pearson Prentice Hall. 2005.

[5]   Napitupulu D. E-Government Maturity Model Based on Systematic Review and Meta-Ethnography Approach. *Jurnal Bina Praja*. 2016; 8(20): 263-275

[6]   Dalimunthe N, Wibisono H. *Jurnal Sains, Teknologi dan Industri*. 2013; 11(1).

[7]   Sun PC, Tsai RJ, Finger G, Chen YY, Yeh D. What drives a successful eLearning? An empirical investigation of the critical factors influencing learner satisfaction. *Computer & Education*. 2008; 1183-1202.

[8]   Napitupulu, D. *Kesiapan Implementasi E-Learning di Lingkungan Universitas XYZ*. Seminar Nasional Tekno Altek, Pusat Penelitian Inovasi LIPI. 2016.

[9]   Davis FD. Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*. 1989; 13(3): 319-339.

[10]   Park SY. An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning. *Educational Technology & Society*. 2009; 12(3): 150–162.

[11]   Al-Adwan A. Exploring Students Acceptance of E-Learning Using Technology Acceptance Model in Jordanian Universities. *International Journal of Education and Development Using Information and Communication Technology*. 2013; 9(2): 4-18.

[12]   Agustiawan Y, Subagyo V. Kajian Penerimaan E-learning Siswa RSBI dengan Technology Acceptance Model (TAM) Untuk Meningkatkan Mutu Siswa SMA di Daerah (Studi Kasus RSBI Kab. Jombang) 2010.

[13]   Alharbi S, Drew S. Using the Technology Acceptance Model in Understanding Academics' Behavioural Intention to Use Learning Management Systems. *International Journal of Advanced Computer Science and Applications*. 2014; 5(1): 143-155.

[14]   Wijaya A. *Analysis of Factors Affecting the Use of Google Classroom to Support Lectures*. The 5th ICIBA International Conference on Information Technology and Engineering Application. 2016; 61-68.

[15]   Thong JYL, Wong W, Tam KY. Determinants of user acceptance of digital libraries: An Empirical Examination of Individual Differences and System Characteristics. *Journal of Management Information Systems*. 2004; 18(3).

[16]   Moon J, Kim Y. Extending the TAM for a World-Wide-Web context. *Information & Management*. 2001; 38: 217-230.

[17]   Gahtani SA. The Applicability of TAM Outside North America: An Empirical Test in United Kingdom. *Information Resource Management Journal*. 2001; 37-46.

[18]   Ghozali I. Aplikasi Analisis Multivariate dengan Program SPSS. Badan Penerbitan Universitas Diponegoro Semarang, edisi 2. 2002.

[19]   Napitupulu D, Kadar JA, Jati RK. Validity Testing of Technology Acceptance Model Based on Factor Analysis Approach. *Indonesian Journal of Electrical Engineering and Computer Science*. 2017; 5(3): 697-704.

[20]   Abraham J, Trimutiasari M. Sociopsychotechnological Predictors of Individual's Social Loafing in Virtual Team. *Indonesian Journal of Electrical and Computer Engineering*. 2015; 5(6): 1500-1510.