

Factors Affecting Teacher's Intention to use E-Learning

Amna Shifia Nisafani
Department of Information Systems
Institut Teknologi Sepuluh Nopember
Surabaya, Indonesia
amna@is.its.ac.id

Feby Artwodini Muqtadiroh
Department of Information Systems
Institut Teknologi Sepuluh Nopember
Surabaya, Indonesia
feby.herbowo@gmail.com

Ryan Arnoldi N.R.
Department of Information Systems
Institut Teknologi Sepuluh Nopember
Surabaya, Indonesia
ryan.arnoldi@hotmail.com

Abstract— The adoption of e-learning technology in Indonesia is limited partly because of user rejection. While one rejecting user is teachers, they play an important role to succeed the implementation of e-learning as they provide e-learning content. Thus, this study aims at investigating factors that affect teacher's intention in using e-learning. In doing so, we employ Technology Acceptance Model (TAM) to assess such factors which consist of several variables: perceived ease of use, perceived usefulness, and intention to develop and offer e-learning course. In addition to TAM, we add three external factors namely facilitating condition, experience, and self-efficacy. As a case study, we analyze the implementation of e-learning in SMP Negeri 1 Jember. We develop a questionnaire based on the model and elicit data for capturing teacher's intention in SMP Negeri 1 Jember. We utilize Structural Equation Model (SEM) to analyze our hypothesis. The result from this study shows that self-efficacy has a positive correlation toward perceived ease of use. Moreover, this correlation is the only hypothesis that being supported, while the others are being rejected. Another interesting finding is that even though the hypothesis expressing that experience has a positive correlation toward perceived usefulness is rejected, the study shows the opposite result that experience has a negative correlation toward perceived usefulness.

Keywords—*e-learning, TAM, user acceptance, e-learning adoption*

I. INTRODUCTION

As one of the products of information technology development, e-learning has provided a new way for teachers and students to engage in learning processes [1]. It uses an electronic application to support teaching and learning activities through the digital medium such as internet or local computer networks [2]. E-learning is a facility to assist learning process by means of information technology [3]. E-learning system helps student's cognitive ability by enabling student to understand learning concept through distributed materials. According to [4], there are three different modes of using e-learning technologies in supporting learning processes. The first is adjunct e-learning which the use of e-learning as a complement in traditional classroom. Second, the use of e-

learning in blended learning which incorporate e-learning to deliver some of learning process in addition to traditional classroom. The third one is total online mode which replaces traditional classroom by conducting learning process fully via online. Additionally, online mode is divided into two types, synchronous and asynchronous. Synchronous allows students and teachers to directly communicate via chat, teleconference or other similar methods. While asynchronous enables students to interact with teachers and other students with time difference through forum discussion, and other similar techniques.

E-Learning implementation comes with pros and cons. In the positive side, e-learning comes with the premise that teacher-student high quality interaction can be done everywhere at any time. Also, e-learning has great potential to reduce teacher's workload in performing class, especially for grading. By doing so, a teacher can better spend his/her time for preparing teaching materials and evaluation and omitting human error in manual correction. In the negative side, e-learning acquisition potentially imposes frustration for teachers. Particularly, for those who are not digital savvy as well as for those who are late adopters in nature. There are a lot of reasons that a teacher may have to support his/her technology rejection. One reason is that a such belief that the effectiveness of the black/white board approach is everlasting [5]. Hence, it cannot be replaced by any digital means at any time. Another reason is that teacher does not have sufficient time to prepare digital materials and evaluation [6]. Surely, these negative attitudes may contribute to the adoption failure or long delay adoption.

In order to ensure that the adoption process is seamless, it is necessary to analyze users' acceptance level. There are many users to involve in the adoption process such as teacher and student. To this point, the user acceptance level measures user 's intention to utilize e-learning. In this study, we focus on the teacher adoption as the sole content provider. Without teacher's participation, it is impossible to assure that the e-learning systems will be available in a regular basis [7].

There are abundant approaches to gauge user acceptance. One prominent approach is to use a model so called Technology Acceptance Model (TAM) [8]. Many researchers perceive that TAM is quite accurate to articulate user acceptance factors in the system implementation.

TAM was initially developed by Davis [9] through his seminal work by extending the Theory of Reasoned Action Model (TRA) of Fishbein and Ajzen [10]. TAM suggests that both *ease of use* and *usefulness* are important to find user behavior and attitudes towards technology usage.

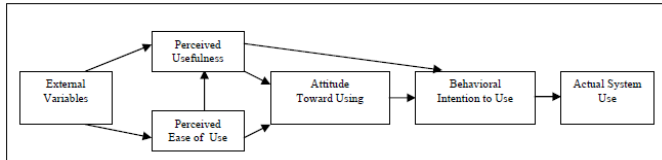


Fig. 1. Technology Acceptance Model

Fig. 1. outlines TAM from two sides: *belief* and *attitude*. Belief consists of two dependent factors namely *perceived usefulness* and *perceived ease of use*. Attitude is divided into three groups namely *attitude toward using*, *behavioral intention to use*, *actual system use*.

This study objective is to observe factors that affect teacher's intention in using e-learning. To do so, we develop conceptual model by adopting Mi-Ryang model. Furthermore, based on Mi-Ryang research, *uneasiness* factor did not significantly correlate with *perceived usefulness* and *perceived ease of use* [11]. Therefore, we omit *uneasiness* factor from the model. In addition, we add another TAM external factor adopted from Waheed [12], i.e. *computer efficacy*. We define *computer efficacy* as *self-efficacy* to represent the confidence of user in using e-learning. Hence, the conceptual model proposed in this research is depicted in the following figure.

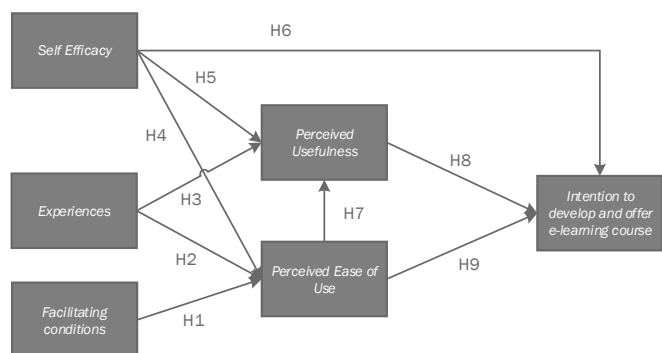


Fig. 2. Conceptual Model

Based on Fig. 2., there are several hypothesis as follows:

H1: *Facilitating conditions for developing and offering e-learning course has a positive correlation toward perceived ease of use.*

It is believed that by having a good facilitating conditions for developing and offering e-learning course, teachers will perceive that e-learning is easy to use

H2: *Experiences in developing electronic materials has a positive correlation toward perceived ease of use.*

It is believed that teachers who have experiences in developing and offering e-learning course will perceive that e-learning is easy to use

H3: *Experiences in developing electronic materials has a positive correlation toward perceived usefulness*

It is believed that teachers who have experiences in developing and offering e-learning course will perceive that e-learning is useful

H4: *Self-efficacy has a positive correlation toward a perceived ease of use.*

It is believed that teachers who confidence in using e-learning will perceive that e-learning is easy to use.

H5: *Self-efficacy has a positive correlation toward perceived usefulness.*

It is believed that teachers who confidence in using e-learning will perceive that e-learning is useful.

H6: *Self-Efficacy has a positive correlation toward intention to develop and offer e-learning course.*

It is believed that teachers who confidence in using e-learning will have intention to develop and offer e-learning course.

H7: *Perceived ease of use has a positive correlation toward perceived usefulness.*

It is believed that teachers who perceive that e-learning is easy to use will perceive that e-learning is useful

H8: *Perceived usefulness has a positive correlation toward intention to develop and offer e-learning course.*

It is believed that teachers who perceive that e-learning is useful will have intention to develop and offer e-learning course.

H9: *Perceived ease of use has a positive correlation toward intention to develop and offer e-learning course.*

It is believed that teachers who perceive that e-learning is easy to use will have intention to develop and offer e-learning course.

As a case study, we use data from middle school SMP Negeri 1 Jember. In this case, SMP Negeri 1 Jember has yet implemented e-learning in its realm. Teachers are using manual approach in class delivery and are using manual action to do class assessment. SMP Negeri 1 Jember does not intend to replace manual teaching processes by the implementation of e-learning systems. Instead, SMP Negeri 1 Jember intends to make the e-learning systems as a complement for existing processes. Therefore, parallel executions of both teaching methods are expected and a lengthy and gradual teacher adoptions of the e-learning systems are acceptable.

The remainder of the paper is in six sections. The first section describes the research background followed by literature review in section two. In section three, we explain our proposed model and research methodology. While in section four and five, we present our result and discussion respectively. Lastly, in section six, we conclude our research.

II. METHOD

We develop a questionnaire based on the proposed model and use it to elicit data from all teachers in SMP Negeri 1 Jember. The questionnaire is adopted from Mi-Ryang [11]. The questionnaire uses Likert scale ranging from 1 to six, from very disagree to very agree. Before we gather data, we conduct several training sessions for teachers in order for them to familiarize with e-learning system. Moreover, by organizing these training sessions, teachers obtain some ideas on how to use e-learning to support learning processes in their classes.

TABLE I. CRITERION SCORE FOR PRESENTATION RANGE

Range	Result
0 – 20%	Strongly Disagree
21 – 40%	Disagree
41 – 60%	Neutral
61 – 80%	Agree
81 – 100%	Strongly Agree

In the end of training session, teachers are asked to fill the questionnaire. We analyze our data using descriptive statistics and employ criterion score (see TABLE I) to depict the actual value of the data. In the end, we utilize Structural Equation Model (SEM) to test our hypotheses using GSCA application

In total, we obtain 32 data with the following respondent profiles.

TABLE II. RESPONDENT PROFILES

Profile	Criteria	# of Respondents
Sex	Female	22
	Male	10
Age	20 – 30 years old	5

Table II, Cont.

	31-40 years old	8
	41-50 years old	12
	> 50 years old	7
Education	Diploma	1
	Bachelor Degree	30
	Master Degree	1
Teaching Experience	<5 years	5
	6-10 years	2
	11-15 years	6
	16-20 years	9
	>20 years	10
Number of Teaching Materials Developed	None	0
	1	0
	2	2
	3	9
	4	11
	> 4	10

III. RESULTS AND DISCUSSION

A. Descriptive Statistics

The following are score criterion calculation for each variable in this research.

TABLE III. CRITERION SCORE FOR EACH VARIABLE

Variable	Result Score	Maximal Score	Percentage
PEOU	1164	1536	75,78%
PU	1218	1344	90,63%
SE	876	1152	76,04%
FAC	348	384	90,63%
INT	863	960	89,90%

From TABLE III, it can be inferred that the vast majority of teachers (more than 75%) agree that they quite confidence in using e-learning. Besides, they also agree that e-learning may be easy to use. In terms of potential benefits, respondents strongly agree that e-learning may be beneficial to support their daily learning activities. Similarly, respondents strongly agree that facilitating conditions is important for them to develop and offer e-learning course. In the end, it is shown that the respondents have a strong intention to develop and offer e-learning course.

B. Linearity Test

Linearity test is a condition of passage of a relationship between independent and dependent variables in a model. In order to test model using GeSCA, it is a prerequisite that independent and dependent variables should be linear [13] with significant value less than 0.05. Here is the result of linearity test for our model.

TABLE IV. LINEARITY TEST RESULT

Variable	Significance	Description
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Table IV, Cont

PEOU->PU	0.003	Significantly Linear
SE->PU	0.033	Significantly Linear
SE->PEOU	0	Significantly Linear
SE->INT	0	Significantly Linear
FAC->PEOU	0.011	Significantly Linear
PEOU->INT	0	Significantly Linear
PU->INT	0.001	Significantly Linear

Based on TABLE V, it can be seen that significance values for linearity test are less than 0.05 for all relationship. Thus, it can be inferred that the relationship between variables is linear.

C. Overall Goodness of FIT

In this section, we test the model to measure the goodness of FIT (GFI). The result of fitness model measurement is depicted in the following table.

TABLE V. FIT TEST RESULT

FIT	0.514
GFI	0.991

From TABLE V, we can see that FIT value is 0.514 which mean that 51,4% variance of all variables used in this research could be explained by the model, while the rest of 48,6% is explained by other variables that are not included in the model. Furthermore, the GFI value of the model is 0.991 which is really close to 1. With the value of GFI more than 0.9, it can be inferred that the overall model is fit.

D. Outer Model Analysis

In this section, we test the measurement model by evaluating *convergent validity*, *composite reliability*, *average variance extracted (AVE)*, and *discriminant validity*. The result for convergent validity can be seen in TABLE VI. Based on TABLE VI, we can see that the estimate values are greater than 0.5. It means that the construct variables are good enough to represent the latent variables. In addition, the value of alpha for each latent variable is greater than 0.7, except variable FAC (Facilitating Conditions). It can be inferred that the composite reliability for PEOU, PU, SE, and INT is good, while that of FAC is not good enough. For AVE value, only three variables that have AVE value greater than 0.5, while two others have AVE value less than 0.5. Furthermore, based on TABLE VI, we can identify that PEOU and INT have alpha greater than 0.7 and AVE greater than 0.5 which mean that these two variables are reliable, while PU, SE and FAC are less reliable. For discriminant validity, the result is presented in Table VII.

From TABLE VII, we can see that the square root of AVE for each variables is greater than other variables, except for SE which is less than PEOU. It can be inferred that the discriminant validity for SE is good enough (since it is only PEOU that is greater than square root of SE), while that of the rest variables is good. It is important to note that we do not

include variable EXP (Experiences) in outer model analysis since it only has one construct variable.

TABLE VI. OUTER MODEL RESULT

Variable	Loading		
	Estimate	SE	CR
PEOU	AVE = 0.607, Alpha =0.886		
PEOU1	0.865	0.037	23.36*
PEOU2	0.826	0.051	16.33*
PEOU3	0.787	0.097	8.13*
PEOU4	0.650	0.125	5.21*
PEOU5	0.802	0.090	8.89*
PEOU6	0.774	0.085	9.06*
PEOU7	0.734	0.102	7.21*
PU	AVE = 0.450, Alpha =0.794		
PU1	0.652	0.203	3.22*
PU2	0.765	0.074	10.34*
PU3	0.573	0.139	4.13*
PU4	0.705	0.109	6.47*
PU5	0.664	0.135	4.94*
PU6	0.714	0.154	4.64*
PU7	0.602	0.161	3.74*
SE	AVE = 0.496, Alpha =0.788		
SE1	0.635	0.184	3.44*
SE3	0.673	0.065	10.32*
SE4	0.516	0.148	3.49*
SE5	0.780	0.082	9.48*
SE6	0.749	0.109	6.84*
SE7	0.827	0.050	16.66*
FAC	AVE = 0.764, Alpha =0.656		
FAC1	0.874	0.052	16.65*
FAC2	0.874	0.047	18.53*
INT	AVE = 0.558, Alpha =0.798		
INT1	0.599	0.145	4.13*
INT2	0.545	0.180	3.02*
INT3	0.766	0.072	10.65*
INT4	0.857	0.046	18.53*
INT5	0.902	0.030	29.59*

TABLE VII. DISCRIMINANT VALIDITY

Variable	AVE	\sqrt{AVE}	PEOU	PU	SE	EXP	FAC	INT
PEOU	0.607	0.779	1	0.542	0.86	0.477	0.302	0.7
PU	0.45	0.671	0.542	1	0.433	0.071	0.42	0.639
SE	0.496	0.704	0.86	0.433	1	0.45	0.31	0.595
EXP	1	1	0.477	0.071	0.45	1	0.113	0.056
FAC	0.764	0.874	0.302	0.42	0.31	0.113	1	0.262
INT	0.558	0.746	0.7	0.639	0.595	0.056	0.262	1

E. Inner Model Analysis

In this section, we conduct structural analysis by identifying R^2 and path coefficients. The R^2 depicts the ability of independent variables to support dependent variables. The closer R^2 to 1, the better these independent variables to support dependent variables. TABLE VIII shows the value of R^2 and Table IX presents path coefficients of the model.

TABLE VIII. R^2 VALUE

R square of Latent Variable	
SE	0
EXP	0
FAC	0
PU	0.436
PEOU	0.755
INT	0.585

Based on TABLE VIII, it can be inferred that variable *Perceived Ease of Use*, *Self-efficacy*, and *Experience* constitute the explanation of *Perceived of Usefulness* with the value of 43,6%. Moreover, perceived ease of use can be explained by *Facilitating Conditions*, *Self-efficacy*, and *Experiences* with the value of 75,5%. Finally, *perceived usefulness* and *perceived ease of use* can explain *intention to develop and offer e-learning course* by 58,5%.

TABLE IX. PATH COEFFICIENTS

Path Coefficients			
	Estimate	SE	CR
SE->PU	-0.060	0.535	0.11
SE->PEOU	0.775	0.102	7.56*
SE->INT	0.016	0.473	0.04

Table IX, Cont.

EXP->PU	-0.424	0.196	2.16*
EXP->PEOU	0.137	0.133	1.03
FAC->PEOU	0.077	0.116	0.67
PU->INT	0.368	0.185	1.99
PEOU->PU	0.795	0.508	1.77
PEOU->INT	0.487	0.471	1.03

Based on TABLE IX, the regression coefficient between variables consists of positive and negative values. The positive correlation happened between *Self-efficacy* and *Perceived Ease of Use*, *Self-efficacy* and *Intention to develop and offer e-learning course*, *Experiences* and *Perceived Ease of Use*, *Facilitating conditions* and *Perceived Ease of Use*, *Perceived usefulness* and *Intention to develop and offer e-learning course*, *Perceived Ease of Use* and *Perceived usefulness*, as well as *Perceived Ease of Use* and *Intention to develop and offer e-learning course*. The negative correlation happened between *Self-efficacy* and *Perceived usefulness* as well as *Experiences* and *Perceived usefulness*. However, among these positive correlations, only *Self-efficacy* toward *Perceived Ease of Use* that is significantly correlated at 0.05. It means that the higher the confidence of teachers using e-learning is, the better the perception of teachers in viewing that e-learning is easy to use. Furthermore, between two negative correlations, only *Experiences* towards *Perceived usefulness* that is significantly correlated at 0.05. It means that the more experience the teachers have in developing electronic materials, the worse the perception of teachers in viewing that e-learning is useful. In addition, the empirical model is depicted in Fig. 3.

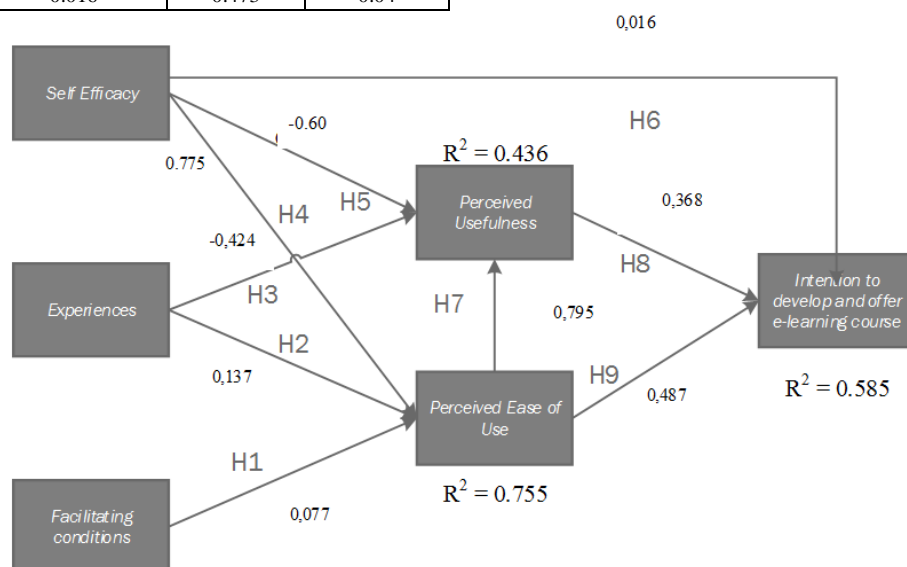


Fig. 3. Empirical Model

From TABLE X and Fig. 3., we summarize the hypothesis testing result as the following table.

TABLE X. HYPOTHESIS TESTING RESULT

Hypothesis	Conclusion	
	Accepted	Rejected
H1: Facilitating conditions for developing and offering e-learning course has a positive correlation toward perceived ease of use.	-	✓
H2: Experiences in developing electronic materials has a positive correlation toward perceived ease of use	-	✓
H3: Experiences in developing electronic materials has a positive correlation toward perceived usefulness	-	✓
H4: Self-efficacy has a positive correlation toward a perceived ease of use.	✓	-
H5: Self-efficacy has a positive correlation toward perceived usefulness.	-	✓
H6: Self-Efficacy has a positive correlation toward intention to develop and offer e-learning course.	-	✓
H7: Perceived ease of use has a positive correlation toward perceived usefulness.	-	✓
H8: Perceived usefulness has a positive correlation toward intention to develop and offer e-learning course.	-	✓
H9: Perceived ease of use has a positive correlation toward intention to develop and offer e-learning course.	-	✓

F. Discussion

The hypothesis testing result shows that the only accepted hypothesis is H4 which support the statement that *self-efficacy* has a positive correlation toward *perceived ease of use*. It is then proven that the higher the teachers' confidence in using e-learning, the better their perception in viewing that e-learning is easy to use. This result complies with previous results by [14], [15], [16], and [17]. Hence, it is important for school management, in this case is SMP Negeri 1 Jember, to boost its teachers' confidence in using e-learning for supporting their learning activities.

In contrast, other hypotheses are rejected. For example, H1 which states that *facilitating conditions* has a positive correlation toward *perceived ease of use*. This result does not comply with previous research by [18]. This can be happened due to two main reasons. The first is the small number of sample [19], and the second is the different teachers' point of view in defining perceived of use. It is interesting to find that based on our interview with respondents, there are two perspectives in viewing *perceived ease of use*, future perspective and current perspective. The future perspective means that some teachers believe that the longer they use e-learning, the easier to use it will be. On contrary, the current

perspective sees that teachers feel that using e-learning is difficult to do when they join our training sessions. Another hypothesis that being rejected is H2. This result complies with [20]. Moreover, H4, H5 and H6 show that self-efficacy does not have a positive correlation toward perceived ease of use, perceived usefulness, and intention to develop and offer e-learning course respectively. These result does not adhere with previous research such as [21] for H4 and H5, and [22] for H6. This happen due to the nature of the respondents which has a low self-efficacy in using e-learning since they impose computer illiteracy. For H8, the result supports previous research by [23] and [9]. While the result of H7 and H9 contradicts with previous research such as [23] for H7 and [9] for H9.

The most interesting finding is that despite H3 is not supported, the result of hypothesis test shows that *experiences in developing electronic materials* has a negative correlation toward *perceived usefulness*. This result contradicts with [11] and [24]. If we look at the respondent profile, it is due to the vast majority of the teachers that are more than 40 years' old which has a low computer literacy. This fact implies that the more experiences the teachers gained in developing electronic materials, the less useful they find e-learning is. Based on our interview, many teachers feel that conventional teaching methods is more beneficial than using electronic sources and systems.

IV. CONCLUSION

This research aims to seek factors affecting teachers' intention to use e-learning in supporting their learning process. We develop research model by adopting Mi-Ryang and Malwish model. We gather data from SMP Negeri 1 Jember as a case study. The result shows that *self-efficacy* has a positive correlation toward *perceived ease of use*, while *experiences in developing electronic materials* has a negative correlation toward *perceived usefulness*.

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