

Analysis of Factors that Affect the Success of E-Learning Implementation of STMIK BI Balikpapan

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Abstract – E-learning in higher education is a technique to improve learning and teaching experience, and as a tool to educate students through digital media, with or without the guidance of their instructors. STMIK BI Balikpapan has been using it since 2015, but its implementation has not been as optimal as expected. The research aims to identify the factors that influence the success of the application of e-learning in STMIK BI Balikpapan by referring to the model adopted from TAM (Technology Acceptance Model) and TOE (technological, organizational and environment). The research respondents were 94 people. Data were collected through questionnaires and analyzed using the Structural Equation Model (SEM) through the Smart PLS program. The results showed that of the four hypotheses tested, one hypotheses had significant influence (habits) and the other three hypotheses were not significant (connections, motivation and facility).

Keywords – The success of the application of e-learning, Structural equation model (SEM), TAM, TOE, and Smart PLS

I. INTRODUCTION

Currently the use of IT has penetrated into various fields of life, including in the world of education, starting from the level of basic education to higher education. An example is the use of E-learning which involves the use of information and communication technology (ICT) to convey teaching and learning. E-learning includes the use of many ICT technologies and has been defined as teaching and learning activities that are facilitated online through network technology.

Likewise, STMIK Borneo International Balikpapan, which also concentrates on increasing the use of online e-learning applications by using the internet to improve the quality of education in these institutions. With easy access to E-learning without being bound by time and place, it is hoped that it can increase student motivation and learning achievement on campus.

Learning to use E-Learning at STMIK BI Balikpapan is one example of the use of existing technology since 2015. E-learning that is implemented is Moodle which provides several features including: teaching materials from lecturers, student grades, assignments, attendance, and online Discussion forum. Of course, the use of this technology can make it easier for students and lecturers to interact. However, the implementation is not the case. Utilization of e-learning technology has not been maximized. Some of the problems found are: The intensity of the use of E-learning by lecturers is still very low. There is still a lack of interaction between educators (lecturers) and students / students, and between students. E-learning requires educators (lecturers) to change the role of educators from what originally mastered conventional learning techniques, to learning techniques using ICT. Allocation of time needed to complete assignments is because most students come from the working class. Facilities and equipment needed in learning activities are inadequate. From these conditions it makes the writer feel interested in analyzing the factors that influence the successful implementation of E-Learning in STMIK Borneo Internasional Balikpapan.

This study uses a model adopted from the TAM (Technology Acceptance Model) and TOE (technology, organization and environment) models. The TAM model was first introduced by Davis in 1986, on the adaptation of TRA (Theory of Reasoned Action) (Fishbein & Ajzen, 1975) to explain technology adoption behavior. The TAM model is one of the models used to measure user acceptance on an information system. This model provides a theoretical basis for understanding the factors that influence the acceptance of an information system in an organization [1]. The TOE (Technology-Organization-Environment) model was first introduced by Rocco DePietro, Edith Wiarda and Mitchell Fleischer (1990). The TOE model was further developed by [2]. The TOE model describes a process by which companies use and implement technological innovations that are influenced by the technological context, organizational context, and environmental context. The TOE model uses three main variables namely Technological context, Organizational context, and Environmental context.

Through this case study, the author will examine several things related to the successful application of e-learning, namely: accessibility factors, habits or habits, student motivation, and available facilities. The author wants to know whether the four variables have a significant influence on the successful implementation of E-learning in STMIK Borneo Internasional Balikpapan. To conduct this study, the author collected research data from 7 permanent lecturers and 188 students at STMIK Borneo Internasional.

The research model used in this study are based on the result of previous studies. In [3] the factors used are (1) understanding and management of e-learning programs conducted by teachers, (2) understanding of e-learning based learning owned by students, (3) Availability of facilities and infrastructure contained in SMKN 2 Pengasih in implementing e-learning based learning. In [4] the research aims to look for factors that influence online discussion participation in SCeLE MTI UI. The results showed that in general the factors influencing SCeLE online discussion participation were extrinsic motivation,



habits, information quality, performance expectancy, social influence, system quality, and service quality. In [5] TAM is used to find the factors that have a significant effect towards the intention to use of mobile banking system.

This research raises the formulation of the problem namely:

1. Does accessibility have an influence on the successful implementation of E-Learning in STMIK Borneo Internasional Balikpapan?
2. Does the habit factor of habit effect on the successful implementation of E-Learning in STMIK Borneo Internasional Balikpapan?
3. Does the student motivation factor have a significant influence on the successful implementation of E-Learning in STMIK Borneo Internasional Balikpapan?
4. Does the factor of facilities owned like cell phones affect the successful implementation of E-Learning in STMIK Borneo Internasional Balikpapan?

II. RESEARCH METHODOLOGY

A. Research Hypothesis

The following is the elaboration of each hypothesis tested in this study, including:

- H1: Accessibility factors have a significant positive effect on the successful implementation of the Balikpapan International STMIK Borneo E-learning
- H2: The habit factor has a significant positive effect on the successful implementation of the STMIK Borneo International Balikpapan E-learning
- H3: Learning motivation factors have a significant positive effect on the successful implementation of the STMIK Borneo International Balikpapan E-learning
- H4: Facilities factor has a significant positive effect on the successful implementation of the STMIK Borneo International Balikpapan E-learning

B. Research Variable

Research variables are attributes or properties or values of people, objects or activities that have certain variations determined by researchers to be studied and then drawn conclusions[6]. The following is the division of research variables is:

1. Exogenous Variables (Independent Variable)

Exogenous variables are variables that are not influenced by previous variables (antecedents). The independent variables in this study are:

- 1) The accessibility factor is symbolized by X1
- 2) The habit factor is symbolized by X2
- 3) The learning motivation factor is symbolized by X3
- 4) The facility factor is symbolized by X4

2. Endogenous Variables (Dependent Variable)

Endogenous variables are variables that are influenced by previous variables. The dependent variable in this study, namely:

- 1) The successful application of E-Learning is symbolized by Y

The indicator of the variable in this study are:

(X1) Accessibility, Accessibility is how something is easy to reach,to enter, use, see,etc. The indicators are based on the research of [3], which are:

- I can access the internet at any time
- I can access the internet anywhere
- I can see the picture display is good and the sound is clear
- I can only access the internet in certain places
- I can only access the internet at certain times
- I access the internet with poor sound and picture quality

(X2) Habit, habit is defined as something that is usually done. Learning habits are a way of acting that is obtained through a learning process that is carried out repeatedly. The indicators are based on the research of [7], indicators are:

- I use internet services any time
- I use internet services at certain hours
- I use internet services for work purposes
- I use internet services as a learning resource

(X3) Motivation. Motivation is an impulse that arises in a person consciously or unconsciously to take an action with a specific purpose. The indicator are based on the research of [4]. The indicators are:

- I often search and find other sources related to lecture materials
- I am able to complete assignments on time
- I want to make friends via the internet
- I can add knowledge about general knowledge via the internet
- I use the internet to fill my spare / free time

(X4) Facilities. Facilities is the extent to which an individual believes that the technical and organizational infrastructure is available to support the use of the system / technology [7]. Facilities influence on behavioral intention and acceptance of E-learning. The indicator are based on the research of [8] and [9].The indicators are:

- I only use a mobile phone with limited specifications
- I am using a mobile phone with advanced specifications
- I only use a laptop
- I use my laptop and mobile phone to get internet service
- I use facilities that are still very limited

C. Population

The population of this study is 7 permanent lecturers, which is 3 lecturers from manajemen informatika program and 4 lecturers from the information system program, and 188 active students, with 8 students from Manajemen Informatika Program and 180 students from the Information System Program, at STMIK Borneo Internasional.

D. Data Analysis Method

Data analysis was performed using Partial Least Square (PLS) analysis. One of the multivariate statistical research techniques that tries to make comparisons between several dependent variables and multiple independent variables,



PLS is part of the SEM statistical method to solve multiple regression [10]. Following are the steps in this research:

- 1) First step: designing a measurement model (outer model). In this stage, the researcher defines and specifies the relationship between the latent construct and the indicator whether it is reflective or formative. Tests conducted on the outer model [11]:
 - Convergent Validity. The convergent validity value is the factor loading value on the latent variable with its indicators. Expected value > 0.7.
 - Discriminant Validity. This value is a cross loading factor value which is useful for knowing whether the construct has adequate discriminant, that is by comparing the loading value of the intended construct must be greater than the value of loading with other constructs.
 - Composite Reliability. Data that has composite reliability > 0.7 has a high reliability
 - Average Variance Extracted (AVE). Expected AVE value > 0.5.
 - Cronbach Alpha. Reliability tests were strengthened with Cronbach Alpha. Expected value > 0.6 for all constructs.
- 2) Second step: designing a structural model (inner model). In this stage, the researcher formulates the relationship model between constructs. Evaluation of the inner model uses Coefficient of determination (R^2), Predictive Relevance (Q^2) and Goodness of Fit Index (GoF). Hypothesis testing is done by looking at the probability value and t-statistics. For probability values, the p-value with an alpha of 5% is less than 0.05. The t-table value for alpha 5% is 1.96. So the hypothesis acceptance criteria is when $t\text{-statistics} > t\text{-table}$.
- 3) Third step: construct a path diagram. The main function of the path diagram is to visualize the relationship between indicators and their constructs and between constructs that will make it easier for researchers to see the model as a whole.
- 4) Hypothesis Test, In general the explanatory research method is a method approach that uses PLS. This is because in this method there is hypothesis testing. Testing the hypothesis can be seen from the t-statistic value and the probability value. For testing hypotheses using statistical values, for alpha 5% the t-statistic value used was 1.96. So the acceptance / rejection criteria Hypothesis is H_a accepted and H_0 rejected when $t\text{-statistics} > 1.96$. To reject / accept the hypothesis using probability, H_a is accepted if the value of $p < 0.05$.

III. RESULTS AND DISCUSSION

A. Result

The number of questionnaires distributed was 108 questionnaires, the number of questionnaires that were filled in completely and returned were 94 questionnaires, the number of questionnaires returned but not filled in was 9 questionnaires, and the number of questionnaires that were not returned was 5 questionnaires.

Outer Model

All loading factors for this research have values above 0.70, as shown in table 1, so that no constructs for all variables are eliminated.

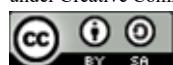
Table 1 Loading Factor

	Facilities	Habit	Accessibi lity	Learning Motivation	Application of E-Learning
X1.1			0,966		
X1.2			0,96		
X1.3			0,969		
X1.4			0,883		
X2.1		0,888			
X2.2		0,846			
X2.3		0,876			
X2.4		0,759			
X3.1				0,847	
X3.2				0,838	
X3.3				0,834	
X3.4				0,802	
X4.1	0,863				
X4.2	0,902				
X4.3	0,912				
X4.4	0,769				
Y1.1					0,964
Y1.2					0,97
Y1.3					0,95
Y1.4					0,901

Discriminant validity is carried out to ensure that each concept of each latent variable is different from the other variables. The model has good discriminant validity if each loading value of each indicator of a latent variable has the greatest loading value with another loading value of another latent variable. The discriminant validity test results are obtained as in table 2.

Table 2 Cross Loading Value

	Facilities	Habit	Accessibility	Learning Motivation	Application of E- Learning
X1.1	0.119	0.349	0.966	0.434	0.189
X1.2	0.132	0.302	0.960	0.399	0.145
X1.3	0.105	0.295	0.969	0.414	0.119
X1.4	0.132	0.340	0.883	0.417	0.081
X2.1	0.286	0.888	0.175	0.615	0.473
X2.2	0.323	0.846	0.182	0.530	0.326
X2.3	0.261	0.876	0.444	0.610	0.383
X2.4	0.451	0.759	0.362	0.504	0.360
X3.1	0.237	0.561	0.292	0.847	0.407
X3.2	0.197	0.594	0.346	0.838	0.288
X3.3	0.202	0.535	0.526	0.834	0.237
X3.4	0.289	0.545	0.353	0.802	0.381
X4.1	0.863	0.257	0.111	0.213	0.182
X4.2	0.902	0.420	0.139	0.268	0.350
X4.3	0.912	0.330	0.060	0.238	0.331
X4.4	0.769	0.273	0.156	0.281	0.168
Y1.1	0.324	0.417	0.098	0.377	0.964



Y1.2	0.359	0.435	0.165	0.415	0.970
Y1.3	0.336	0.435	0.130	0.351	0.950
Y1.4	0.207	0.473	0.181	0.420	0.901

From table 2, it can be seen that each latent variable has a good discriminant validity because each loading value of each indicator of a latent variable has the greatest loading value with other loading values to other latent variables.

Table 3 presents the Composite Reliability and AVE values for all variables. It can be concluded that all constructs meet reliable criteria. This is indicated by the value of composite reliability above 0.70 and AVE above 0.50 as recommended criteria.

Table 3 Composite Reliability and Average Variance Extracted

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Facilities	0.889	0.964	0.921	0.745
Habit	0.864	0.883	0.908	0.712
Accessibility	0.961	1.041	0.971	0.893
Learning Motivation	0.852	0.873	0.899	0.689
Application of E-Learning	0.961	0.962	0.972	0.896
AVERAGE				0.787

Inner Model

Testing the inner model or structural model is done to see the relationship between the construct, the significance value and the R-square of the research model. The structural model is evaluated using R-square for the dependent construct of the t test as well as the significance of the coefficient of structural path parameters. The structural model is shown in figure 1.

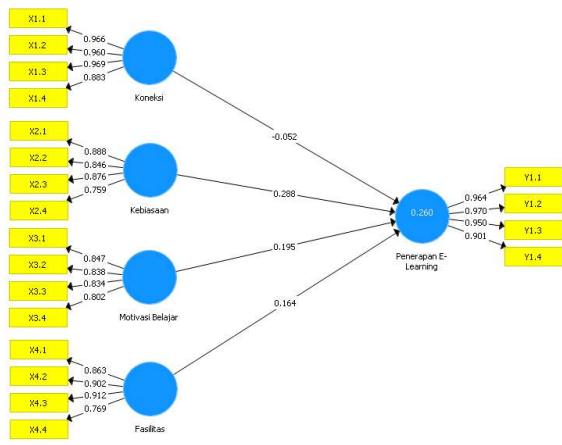


Figure 1 Structural Model

Information:



: Endogen Variable



: Moderation Variable Indicator

Table 4 is the result of R-square estimation using SmartPLS.

Table 4 R-Square Value

	R Square	R Square Adjusted

E-Learning Implementation	0.260	0.226
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Table 4 shows the *R-square* value for the E-Learning Implementation variable obtained by 0.260. Furthermore, testing the inner model can be done by looking at the value of *Q-square* (predictive relevance). To assess the Q-square can be done using the equation:

$$Q^2 = 1 - (1 - R^2) \quad \dots\dots\dots(1)$$

The Q-square result using equation (1) is 0,260 or 26%.

The next step of testing the model structure is to assess the *Goodness of Fit (GoF)*. The GoF value can be found using the equation:

$$GoF = \sqrt{AVERAGE \times R^2} \quad \dots\dots\dots(2)$$

Using the *AVERAGE* value from table 3 and the *R²* value from table 4, then the result for *Goodness of Fit* is 0,452, which categories large category according to [12].

Hypothesis Testing Result

The significance of the estimated parameters provides very useful information about the relationship between the research variables. The basis used in testing the hypothesis is the value contained in the output result for inner weight. Table 5 provides the estimated output for structural model testing.

Table 5 Result For Inner Weight

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Facilities > Application of E-Learning	0.164	0.180	0.095	1.722	0.086
Habit > Application of E-Learning	0.288	0.284	0.127	2.270	0.024
Accessibility > Application of E-Learning	-0.052	-0.036	0.125	0.414	0.679
Motivasi Belajar > Application of E-Learning	0.195	0.211	0.116	1.676	0.094

In PLS statistical testing every hypothesized relationship is carried out using simulations. In this case the bootstrap method is performed on the sample. Bootstrap testing is also intended to minimize the problem of research data abnormalities. The bootstrapping test results of the PLS analysis are as follows:

1. Effect of Accessibility on E-Learning Implementation

The test results indicate that the effect of accessibility variables with the application of e-learning shows the path coefficient of -0.052 with a t value of 0.414. This value is smaller than t table (1.960). This result means that accessibility does not have a positive and significant effect on the application of e-learning. This also shows that the indicators of accessibility consisting of can be accessed

at any time, can be accessed anywhere, display good pictures and clear sound, can only be accessed in certain places, certain times with poor sound and picture quality does not affect the indicators - e-learning application indicators consisting of E-learning can be accessed easily, E-learning makes it easy for students to learn from various sources, E-learning helps students interact with lecturers and friends, e-learning motivates students to complete assignments on time.

2. The influence of habits on the implementation of e-learning

The test results show that the influence of the habit variable with the application of e-learning shows the path coefficient of 0.288 with a t value of 2.270. This value is greater than t table (1.960). This result means that habits have a positive and significant effect on the application of e-learning. It also shows that indicators of habits which consist of using internet services at any time, using internet services at certain hours, using internet services for work purposes, using internet services with very limited time affect indicators of the application of e-learning that consists of E-learning that can be accessed easily, E-learning makes it easy for students to learn from various sources, E-learning helps students interact with lecturers and friends, e-learning motivates students to complete assignments on time.

3. The Effect of Learning Motivation on the Implementation of E-Learning

The test results show that the influence of learning motivation variables with the application of e-learning shows the path coefficient of 0.195 with a t value of 1.676. This value is smaller than t table (1.960). This result means that learning motivation has no positive and significant effect on the application of e-learning. It also shows that indicators of learning motivation consisting of searching for and finding other sources related to lecture material, looking for friends, adding insight into general knowledge, filling in spare time / leisure do not affect the indicators of the application of e-learning consisting of E-learning can be accessed easily, E-learning makes it easy for students to learn from various sources, E-learning helps students interact with lecturers and friends, e-learning motivates students to complete assignments on time.

4. Effect of Facilities on the Implementation of E-Learning

The test results show that the effect of facility variables with the application of e-learning shows a path coefficient of 0.164 with a t value of 1.722. This value is smaller than t table (1.960). This result means that the facility has no positive and significant effect on the application of e-learning. This also shows that the indicators of the facilities which consist of only using mobile phones with limited specifications, using mobile phones with advanced specifications, only using laptops, using laptops and mobile phones to obtain internet services do not affect the indicators of e-implementation learning that consists of E-learning can be accessed easily, E-learning makes it easy for students to learn from various sources, E-learning helps students interact with lecturers and friends, e-learning motivates students to complete assignments on time.

B. Discussion

Based on the results of statistical calculations, it can be concluded that the construct of accessibility has no effect on the construct of implementing e-learning directly. This can be seen from the t-statistic value smaller than 1.96 which is equal to 0.414. This shows that accessibility does not have a direct influence on the application of e-learning. results of this study contradict the research of [4] that found that there are several factors that influence online discussion participation, namely: extrinsic motivation, habits, information quality, performance expectancy, social influence, system quality, and service quality. Factors that greatly influence behavioral intention are performance expectancy, habits, extrinsic motivation, and social influence. Meanwhile, factors that greatly affect user satisfaction are information quality, system quality and service quality.

With reference to the results of statistical calculations, it can be concluded that the construct of habits influences the construct of the application of e-learning directly. This can be seen from the t-statistic value greater than 1.96 which is equal to 2.270. This shows that habits affect the application of e-learning. The results of this study contradict the research of [4] that found that there are several factors that influence online discussion participation, namely: extrinsic motivation, habits, information quality, performance expectancy, social influence, system quality, and service quality. Factors that greatly influence behavioral intention are performance expectancy, habits, extrinsic motivation, and social influence. Meanwhile, factors that greatly affect user satisfaction are information quality, system quality and service quality.

By using the results of statistical calculations, it can be concluded that the construct of learning motivation does not have a significant positive effect on the construct of the application of e-learning directly. This can be seen from the t-statistic value which is smaller than 1.96 which is equal to 1.676. This shows that learning motivation does not have a significant direct effect on the application of e-learning. These results are different from previous studies, namely [13], that found that the effectiveness of e-Learning is influenced by the ease of use factor, the wealth of media interaction used (media richness), and external motivation (extrinsic motivation).

Referring to the results of statistical calculations, it can be concluded that the facility construction has no significant positive effect on the construct of e-learning implementation directly. This can be seen from the t-statistic value smaller than 1.96 which is 1.722. This shows that facilities do not have a significant direct effect on the application of e-learning. The results of this study differ from the study of [14] that gender factors influence students in using the SCeLe Online Discussion System at the University of Indonesia Information Technology Masters Program. In male sex, the influences are e-learning motivation, social influence and facilitating condition, while for female gender the factors that have significant influence are social influence, teacher's roles and facilitating condition.



IV. CONCLUSION

Based on the results of the analysis that has been done, the factors that have significant effect on the application of learning at STMIK Borneo Internasional is Habits, while Accessibility, Learning motivation and Facilities does not have a significant effect on the application of e-elearning. For further researchers, it is expected to expand the research area other than at the STMIK Borneo International Balikpapan to have a bigger view of the application of e-learning.

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