Factors Influencing The Use of E-Class

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***Abstract*—Education is one of the most important factors in determining the advancement of a nation. Education can be obtained from formal and non-formal educational institutions. The aim of this study is to analyze the factors that are influencing the participants in using the e-Class system by using the integrated technology acceptance model (TAM) and task-technology fit (TTF) model. Data used for this study was acquired from questionnaires sent to users of e-Class system between the year of 2011 and 2012. There were 76 questionnaires answered out of 110 questionnaires being sent to the respondents in PT. XYZ. The data gathered was analyzed using partial least squares. This study found that perceived ease of use, perceived usefulness, and task-technology fit are the factors that are significantly influencing participants in using e-Class.**

***Index Terms*—E-Learning, e-Class, technology acceptance model, TAM, task-technology fit, TTF, partial least squares**

I. Introduction

Education is very important as it is the main requirement to be a better nation. Education can be acquired through formal education institutions, as well as through non-formal education institutions such as the training providers. Various methods are used by educational institutions in order to achieve better performance, such as the use of information technology through the e-learning system. E-learning system has the advantage of enabling the participants and faculty to interact with each other regardless of time and place [1].

In addition to the application in formal education, the implementation of electronic learning is also done on informal education institutions, for example through a system called e-class. E-class is expected to be one of the alternative, for example for those who are working to acquire certain knowledge and skills. For informal education providers, e-class is also expected to increase the organization's revenue by involving more participants in each training run.

This study was conducted to analyze the factors that determine the acceptance of e-class from the student's perspective. The model used in this study is an integrated model of technology acceptance model (TAM) with a model of task-technology fit (TTF). Combination of TAM and TTF can provide theoretical bases that are needed to find out the factors that can explain the use of an IT application and its relationship with user performance [2].

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As a case study, this research was conducted at PT. XYZ. XYZ is a training provider which is managed professionally and has legal status. XYZ was founded in 2005 and based in South Jakarta. XYZ provides specialized services to the people who want to learn and deepen their knowledge regarding taxation.

II. Literature Review

Information systems technology acceptance model used in this study is the integration between technology acceptance model (TAM) and task-technology fit (TTF). This is because TAM is already known and widely accepted in the study of behavior that aims to understand how beliefs and attitudes influence the behavior of users use their technology [3]. While TTF, extend the functionality of TAM by considering how a task will affect the use of information systems technology [4]. Therefore, the use of an integrated model of TAM and TTF will provide a model that is more powerful than the model using TAM or TTF alone [2].

Technology acceptance model (TAM) was first introduced by Davis, [5] which was developed from the theory of reasoned action (TRA) of Ajzen and Fishbein [6] in a psychology study [7]. According to Ajzen and Fishbein [6], theory of reasoned action (TRA) is a model for predicting intention of a behavior based on attitudinal and normative beliefs each individual [8]. The theory of planned behavior (TPB) is the development of the theory of reasoned action (TRA) made due to the lack of a TRA in dealing with behaviors which are not controlled by the will of a person [9].

While the TRA and TPB try to explain and predict the behavior of a person through a broad domain areas, technology acceptance model (TAM) has been proposed as an adaptation of the TRA is more specifically aimed at explaining the behavior of the use of computers/information technology [10]. TAM has two main constructs, namely perceived usefulness and perceived ease of use. Perceived usefullness is defined as an individual's belief that the use of a particular information system will improve his/her performance. While perceived ease of use is defined as the degree to which a person believes that the use of information systems is easy and requires no effort from users [5].

TTF is influenced by two main constructs, namely task characteristics and technology characteristics. In the theory of task-technology fit (TTF), IT is very likely to have a positive impact on an individual's performance and utilization when the technology characteristics fit with tasks characteristics. Tasks construct can be

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translated as the actions performed by a person to change inputs into outputs. TTF recommended that the adoption of a technology depends on how far the technology can be used to meet the requirements of a task [11].

Dishaw and Strong, [2] suggests to integrate TAM model with the TTF model as they are able to provide more significant explanation for the variations in the use of technology. Integration of TAM and TTF will be useful to understand the use of applications in a wider range of conditions, which is where it is most beneficial to the provider of the application.

III. Conceptual Model

Conceptual model of this study is a combination of theory TAM and TTF involving six (6) construct as can be seen in Fig. 1.

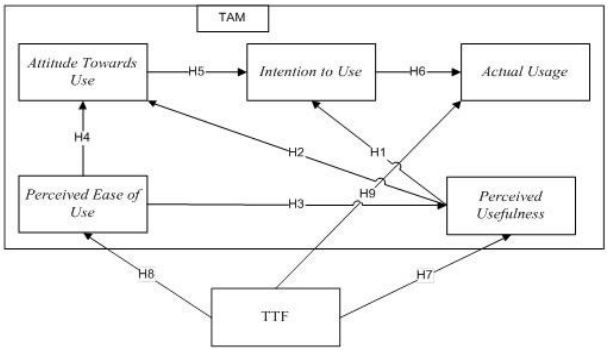

Figure 1. Research Model

Based on Fig. 1, our research model can be composed of nine hypotheses as follows:

- H1: Perceived usefulness has a positive effect on the intention to use of E-Class system.
- H2: Perceived usefulness has a positive effect on attitude towards use of E-Class system.
- H3: Perceived ease of use has a positive effect on perceived usefulness of e-Class system.
- H4: Perceived ease of use has a positive influence on attitude towards use of e-Class system.
- H5: Attitude towards use has positive influence on intention to use e-Class system.
- H6: Intention to use has a positive influence on actual usage of E-Class system.
- H7: TTF has a positive effect on the perceived usefulness of e-Class system.
- H8: TTF positive effect on perceived ease of use of e-Class system.
- H9: TTF has a positive effect on the actual usage of e-Class system.

IV. Methodology

This research was conducted at PT. XYZ which is located in Kuningan, South Jakarta. Population of the study is all participants who had used the e-Class system between 2011 through 2012 as this mode was initiated in 2011. The total population for this study was 110 person, so we used a saturated sampling technique in which the entire member is considered as the research sample.

The questionnaire was made using Google Docs app providing links so that respondents can fill out the online questionnaire. The questionnaire consisted of six questions regarding demographics of respondents, twenty for (24) questions related to construct. The questionnaire was developed by using 5-points Likert scale. Scale 1 means strongly disagree and 5 scale means strongly agree. The time needed to complete the questionnaire estimated at around 10 minutes.

Data collected from the respondents were analyzed using partial least squares (PLS) to test the research hypotheses. PLS is a statistical method of structural equation modeling (SEM) with the variant-based approach [12], [13]. PLS can be used where the sample size is not too large [14]. In this study, we used WarpPLS version 3.0 to conduct statistical analysis. WarpPLS provides the P value which is more useful than the T value for a hypothesis test [15].

V. Results

A. Respondent Demographics

From 110 questionnaires distributed, only 76 questionnaires were returned or our response rate was around 69%. Among these 76 questionnaires, 2 of them were declared invalid, so that in total we have 74 valid questionnaires to proceed. Among these valid questionnaires, 55 respondents answered the questionnaire by phone (74%) and 19 respondents answered via e-mail (26%). Demographics of the respondents are shown in Table I.

TABLE I. Demographics of Respondents

Profile		Total of respondents	Percentage (%)
Sex	Male	60	81
	Female	14	19
Age (year)	< 25	2	3
	25-35	18	24
	> 35	54	73
Location	Jakarta	21	28
	Outside Jakarta	53	72
Internet experience (year)	< 5	6	8
	5-10	24	32
	> 10	44	60
Education	Diploma	4	5
	Bachelor	50	68
	Master	19	26
	PhD	1	1

B. Measurement and Structural Model Testing

We analyzed the relationship between indicators and their latent variables and relationships among latent variables. We used jackknifing resampling method. Analysis starts by evaluating measurement model. The validity of each indicator and variables were evaluated by using convergent validity and discriminant validity. While the reliability of each variable was evaluated by

using composite reliability. The evaluation of the measurement model used reflective indicators for each observed variable represents the reflection or manifestation of any latent variables/constructs [14].

TABLE II. CONSTRUCT VALIDITY AND RELIABILITY

Variable/Indicator	Convergent Validity		Disc. Val.*	CR
	Loading	Conclusion		
Perceived ease of use (PEU)			0,691	0,783
PEU1	0,737	*Valid*		
PEU2	0,774	*Valid*		
PEU3	0,578	*Valid*		
PEU4	0,657	*Valid*		
Perceived usefulness (PU)			0,798	0,838
PU1	0,113	*Drop*		
PU2	0,811	*Valid*		
PU3	0,653	*Valid*		
PU4	0,906	*Valid*		
Attitude towards use (AT)			0,767	0,851
AT1	0,766	*Valid*		
AT2	0,804	*Valid*		
AT3	0,707	*Valid*		
AT4	0,789	*Valid*		
Intention to use (IU)			0,876	0,909
IU1	0,869	*Valid*		
IU2	0,861	*Valid*		
IU3	0,899	*Valid*		
Actual usage (AU)			0,817	0,855
AU1	0,618	*Valid*		
AU2	0,896	*Valid*		
AU3	0,905	*Valid*		
Task-technology fit (TTF)			0,695	0,785
TTF1	0,808	*Valid*		
TTF2	0,714	*Valid*		
TTF3	-0,437	*Drop*		
TTF4	0,584	*Valid*		
TTF5	0,517	*Valid*		
TTF6	0,493	*Drop*		

*is the square root of average variance extracted (AVE).

Measurement model evaluation results can be seen in Table II. Value of convergent validity (loading) of reflective indicators is considered valid if it has a value above 0.5 [16], otherwise the indicator should be discarded. Based on Table II, loading values indicate that there are 21 valid indicators with loading values ranged from 0.517 to 0.906 and the others had to be dropped as they have loading values less than 0.5. A construct is said to have a good discriminant validity when it has Square Root AVE value above 0.5 [16]. AVE Square Root values of all constructs were in the range of 0.691 to 0.876, so that all variables were said to be valid.

The reliability of the variables can be seen from the composite reliability (CR). CR value of reflective variables are considered reliable if they have value ≥ 0.7 [16]. If composite reliability of latent variable does not meet the criteria, then the variable is recommended to be dropped. Results of CR values indicate that these six latent variables are reliable with values for CR ranged from 0.783 to 0.909.

After successfully evaluated the validity and reliability of the measurement model, the next step is to evaluate the structural model. Results of evaluation of the structural model using WarpPLS application can be seen in the analysis of the path diagram in Fig. 2.

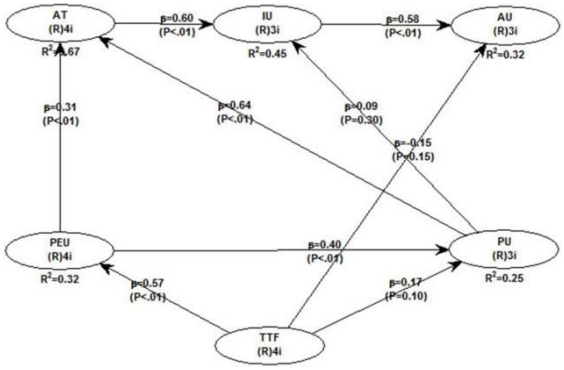

Figure 2. Path diagram of research model

Based on Fig. 2, the path coefficient values (β) of the model ranged from -0.148 to 0.643 and p values ranged from <0.001 to 0.304. Results of evaluation of the structural model can be described using indicators R-square (R^2) and Q-squared (Q^2) as can be seen in Table III. In the R-square coefficient (R^2), the higher the R^2 value, the better the explanatory power of each latent variable will be [17]. Our results showed that the range of R^2 values of each endogenous latent variables ranged from 0.246 to 0.669. Perceived ease of use (PEU) has R^2 value as many as of 0.32 indicates that as many as 32% of the PEU variance is determined by task-technology fit (TTF). Perceived usefulness (PU) has R^2 values as many as of 0.246 indicates that as many as 24.6% of PU variance determined by the PEU and TTF, and so on. While the coefficient of Q-squared (Q^2) should have values with a range $0 < Q^2 < 1$, where values close to 1 means the better models [16]. From the output of WarpPLS, it can be concluded that all variables have a value of $Q^2 > 0$ so that the estimates made by the model cab be considered as relevant.

TABLE III. R^2 AND Q^2 OF STRUCTURAL MODEL

Constructs	R^2 Value	Q^2 Value
Perceived ease of use (PEU)	0,32	0,323
Perceived usefulness (PU)	0,246	0,248
Attitude towards use (AT)	0,669	0,667
Intention to use (IU)	0,448	0,454
Actual usage (AU)	0,315	0,305

C. Results and Discussions

Null hypothesis (H0) will be rejected (accept Ha) if the path coefficients > 0.100 and p-value below the significance level (α = 0,05). P-values were obtained from jackknifing resampling method. Table IV

summarizes the results of hypotheses testing of the research model.

TABLE IV. HYPOTHESES TESTING RESULTS

Hypothesis	Path	β	p-*value*	Conclusion
H1	PU to IU	0,091	0,304	Not significant
H2	PU to AT	0,643	<0,001	Significant
H3	PEU to PU	0,403	<0,001	Significant
H4	PEU to AT	0,307	<0,001	Significant
H5	AT to IU	0,598	<0,001	Significant
H6	IU to AU	0,583	<0,001	Significant
H7	TTF to PU	0,169	0,099	Not significant
H8	TTF to PEU	0,566	<0,001	Significant
H9	TTF to AU	-0,148	0,145	Not significant

Table IV shows that there are six hypotheses which are considered significant, H2, H3, H4, H5, H6 and H8. This means that these sixth hypotheses are accepted. Three other hypotheses, i.e. H1, H7 and H9, suggests that the relationships are not significant,.

This study found that perceived usefulness and ease of use of E-Class system will influence the attitude toward use of the participants during the use of the e-Class system. This finding is in line with Masrom [7]. The study also found that the perceived ease of use influences the perceived usefulness of the e-Class system (H3). This finding is in line with Gong, Xu and Yu [10]. The study also found that the attitude of the participants during the use of e-Class will affect the intention of the participants to use e-Class systems (H5). This finding is in line with the results of Pittalis and Christou [3]. The study also found that the actual use of e-Class system is affected by the intentions to use of the participants. This finding is in line with the results of Klopping and McKinney [4]. At last, our study also found that the quality and capabilities of the e-Class system (task-technology fit) in fitting the needs of the e-Class will affect the ease of use perceived by the participants of e-Class system. This finding is in line with Dishaw and Strong [2].

D. Implications and Limitations of the Study

E-Class system acceptance using integrated model of TAM and TTF needs to be explored further, because this study revealed a number of findings that are not in line with the previous findings. This may be influenced by the characteristics of the Indonesian people and the quality of e - Class system itself. Based on the results of our study, we need to be aware that the use of the e-Class system is not only influenced by the ease and usefulness of the system, but also how the system can meet the characteristics of the user task. Results of the open ended questions we enclosed in the questionnaire showed that the e-Class system cannot accommodate the needs of the participants, particularly to facilitate the interaction between instructors and participants. According to respondents, the interaction in the e-Class in the case study should be done through e - Class system operator, thereby it would be inhibiting the interaction if the operator is not responsive.

The strength of this study is that the data obtained from participants who are accustomed to interact using online applications (82 % of respondents have experience with internet over 5 years). However, the shortcoming of this study is the sample size used in this study is relatively small. Although the sample in the study exceeded the recommended minimum in PLS (n = 74, where PLS requires 50 at minimum), the use of more samples would make research results become more general. In addition, the questions for task-technology fit (TTF) construct in this study is less focused on obtaining information about the quality and capability of e-learning systems. The questions we designed were more focused to obtain information about the quality and capabilities of information systems in general. Therefore, we need to design more relevant questions related to e-learning system in order to ensure appropriate context.

VI. CONCLUSIONS

This study successfully integrates the theory of TAM and TTF to explain the factors that affect the interests of participants in the use of e-Class. Based on the statistical results of survey we conducted in our case stud, we can conclude that factors that affect the interests of the participants in using e-Class, among others are: (1) perceived usefulness, (2) perceived ease of use, and (3) fit between tasks and technology (task-technology fit). When designing e-Class systems, training providers should considers these factors to increase the success of program they offer.

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