EVALUATION OF E-CMS USING TAM: FOCUSING ON LECTURER ACCEPTANCE

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Abstract: Characteristic of modern academic institutions is the utilization of information technology (IT) in the educational activities, including implementation of electronic course management systems (e-CMS). It provides various roles that support institutions staffs to achieve effective and efficient way of teaching. There are several factors that affect e-CMS' implementation, for instance support from university, the characteristics of the specific e-CMS application, and the acceptance of users. The acceptance of lecturers as one of e-CMS' main user is critical to determine the acceleration of the e-CMS implementation. The objective of this paper is to evaluate e-CMS implementation in Petra Christian University (PCU) by focusing on lecturers' acceptance of e-CMS. The Technology Acceptance Model (TAM) framework utilized for the evaluation process. The study found that perceived usefulness is the major concern of Petra Christian University's (PCU) lecturers in their attitude and acceptance to use e-CMS. The Partial Least Squares (PLS) analysis employed to analyze the structural model in this research.

Keywords: e-CMS, Acceptance, Perceived Usefulness, TAM, and PLS

Introduction

Nowadays, due to the lack of high levels of system user acceptance, implementing an information system strategy can be both costly and unsuccessful. The information system such as e-CMS, which is a web-based course management system, developed to support the traditional face-to-face teaching learning process.

Petra Christian University (PCU) is a private university in Indonesia with core competencies as International Standards University, IT-Based Campus, and excellence, effectiveness & efficiency of learning process. In order to sustain and support these competencies, PCU increasingly explore the potential uses of e-CMS technology. PCU has been developing and implementing e-CMS since 2000. e-CMS are used by lecturers to provide course, news and FAQ; upload class materials; manage online quizzes and grades; and do online discussion among members of the class. It is important to identify and evaluate lecturers' attitude and acceptance toward the e-CMS implementation, whether or not the e-CMS really help the lecturers in managing their courses. Therefore, the focus of this research is to identify the variables affecting lecturers' acceptance in e-CMS implementation.

The evaluation of e-CMS implementation is based on Technology Acceptance Model (TAM). The model is focused on one independent variable (perceived ease of use) and two intervening variables (perceived of usefulness and attitude) to determine the acceptance of e-CMS.

Literature Review

Electronic Course Management System (e-CMS) is one of e-Learning systems used to deliver learning content via internet. Colleges and universities widely use e-CMS to organize and distribute course content, administer learning exercises or quizzes and track student progress. It is used to support face-to-face instruction. E-CMS applications run on a web or network server and can employ an open source CMS such as Moodle. The users of the system are lecturers, students and university's administrator.

Stacey and Gerbic (2008), Awidi (2008) and Ragan (2007) suggest some factors affecting the successfulness of e-CMS. The first is institutional support, such as organizational preparations; sufficient support for pedagogy, collaboration and technical functions; good communication and feedback channels to all users; and controlling the quality of CMS's life cycle. The second is fairness and reliability of the system to all users. Institution must assess the users' acceptability and user-friendly systems, and certify the system can run accurately at the first time and all the time. The third is validity and practicability of the system in all situations. Institution must ensure that users can access what the system claims to provide and determine the extent of training and all resources required to use the system properly.

Technology Acceptance Model (TAM) was theorized and tested by Davis (1989) as model to understand user acceptance of new information system technology. Base on the logic of the Theory of Reasoned Action (TRA), TAM postulate the causal linkages amongst two key variables—*perceived usefulness* and *perceived ease of use*—and users' attitude, behavioral intentions, and actual system adoption and use (Park, 2010). According to Davis (1989), perceived usefulness (PU) is "*the degree to which a person believes that using a particular system would enhance his or her job performance*." While, perceived ease of use (PEOU) defined as "*the degree to which a person believes that using a particular system would be free of effort*."

The capability of TAM as a model to measure users acceptance of technology has been tested with numerous studies, in various technology, field and location, for example: word processors (Davis, Bagozzi, & Warshaw 1989), medical record system in Australia (Handy, Whiddett & Hunter, 2001), internet banking in

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Jordan (Sukkar & Hasan, 2005), digital library in Peru and Kenya (Miller & Khera, 2010), web-based learning in Hongkong (Gong, Xu & Yu, 2004), and e-government in Cambodia (Sang, Lee & Lee, 2010).

TAM model that is employed in this study has been reduced by eliminating actual system use and external variables. Therefore, the research hypotheses based on the relationship of the variables in TAM model for this study are:

H1: Perceived ease of use (PEOU) has a significant effect on the perceived usefulness (PU) of the system.
H2: Perceived ease of use (PEOU) has a significant effect on attitude towards using (ATT).
H3: Perceived usefulness (PU) has a significant effect on attitude towards using (ATT).
H4: Perceived usefulness (PU) has a significant effect on intention to use (INT).
H5: Attitude towards (ATT) using has a significant effect on intention to use (INT).

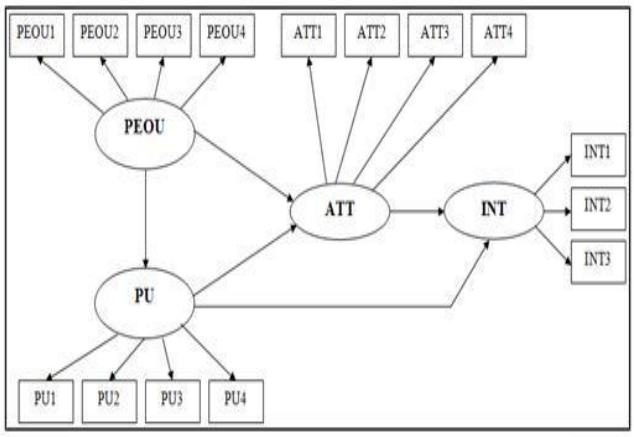

Figure 1: Research Model

Research Methodology and Result

There are three structural equations developed base on the hypotheses of this study:

$$PU = \gamma_1 PEOU + \zeta_1 \quad \text{(Eq. 1)}$$

$$ATT = \gamma_2 PEOU + \beta_1 PU + \zeta_2 \quad \text{(Eq. 2)}$$

$$INT = \beta_2 PU + \beta_3 ATT + \zeta_3 \quad \text{(Eq. 3)}$$

The instrument to collect data is a set of 5 points Likert type-scale questionnaire that adjusted from the basic TAM questionnaire (Masrom, 2007) and translated to Indonesian language (bahasa). The questionnaire consists of 15 questions that reflect each of indicator variables in the structural model. The questionnaire developed in a Google free source spreadsheet and distributed by a link to PCU's official email.

The whole respondents are PCU's lecturer that own PCU's official email (N=272) and only 40 lecturers responses received (14.71%). Respondents' demography profile shows 55% of them are male and 45% are female, the age distribution majority in range 30-40 years old (45%). The department distribution shows that most of respondents are from economic faculty (42.5%), and then industrial technology faculty (32.5%). Majority respondents have tenure in range 5-10 years (47.5%), and educational background as Master degree (77.5%). Due to the small sample size compared with the number of variables, the Partial Least Squares (PLS) analysis employed to analyze the structural model in this research (Gong, 2004).

Reliability and validity analysis was conducted to test the consistency of indicators for each variable latent. In this study, Cronbach Alpha is used for reliability test and factor loading for validity test. Table 1 indicates that all variables exceed the adequate levels for reliability (>0.6) and validity.

Table 1: Reliability and Validity Result

Construct	Scale	Factor Loading	Cronbach Alpha
PEOU	PEOU1	0.937	0.967
	PEOU2	0.968	
	PEOU3	0.954	
	PEOU4	0.962	
PU	PU1	0.897	0.903
	PU2	0.898	
	PU3	0.881	
	PU4	0.884	
ATT	ATT1	0.830	0.916
	ATT2	0.876	
	ATT3	0.956	
	ATT4	0.938	
INT	INT1	0.938	0.915
	INT2	0.971	
	INT3	0.877	

Goodness of Fit of the structural model (equation) is examined by analyzing the estimate path coefficients and the R-square value (Figure 2); whereas the hypotheses is tested with t-value (>1.96) and sig α (p-value< 0.05) shown in Table 2.

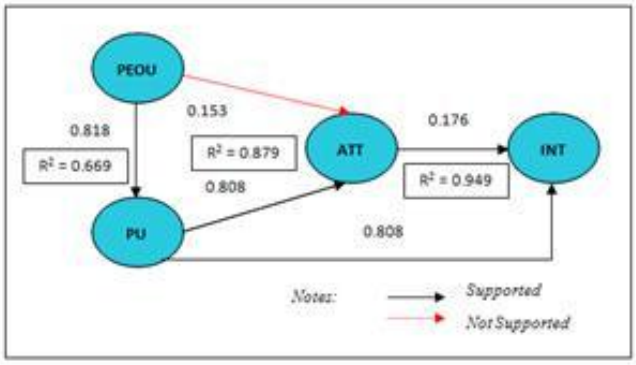

Figure 2: Goodness of Fit Result

Table 2: Test of Hypotheses

Structural Model	t-value	p-value	Analysis
PEOU → PU	23.475	0.000	Significant
PEOU → ATT	1.634	0.052	Not Significant
PU → ATT	9.976	0.000	Significant
PU → INT	10.507	0.000	Significant
ATT → INT	2.0950	0.019	Significant

(Eq.1) PU = 0.818 PEOU + ζ_1, R^2 = 0.669. The equation is able to explain 66.9% of variance in the construct of PU where PEOU has positive relationship with PU by 0.818 with t-value and p-value above the satisfactory levels. Therefore, we can conclude that PEOU has significant effect on PU (H1).

(Eq.2) ATT = 0.15 PEOU + 0.808 PU + ζ_2, R^2 = 0.879. The equation is able to explain 87.9% of variance in the construct of ATT. PEOU has positive relationship with ATT by 0.15; however, the p-value is less than sufficient level that means that the effect of PEOU on ATT is not significant (H2). On the other side, PU has positive relationship with ATT by 0.808 and adequate level of p-value, therefore PU has a significant effect on ATT (H3).

(Eq.3) INT = 0.808 PU + 0.176 ATT + ζ_3, R^2 = 0.949. The equation is able to explain 94.9% of variance in the construct of INT. PU and ATT has positive relationships with INT by 0.808 and 0.176. At the same time, the t-value and p-value also exceeding the adequate level, thus PU and ATT have a significant effect on INT (H4 and H5).

Based on mean analysis, the PEOU's indicators show most of lecturers somewhat disagree that e-CMS is easy to use and learn (means' range are 3.68–3.98). However, in their attitude, they like the idea of using e-CMS (means' range is 3.22–4.38). Consistently, in the PU's indicators, lecturers actually agree that e-CMS would increase their learning productivity and it would be very useful for them (means' range is 3.75–4.40). Finally, the INT indicators show lecturers would use and intent to visit e-CMS frequently for their teaching works (means' range is 3.785–4.20).

The results imply that PCU's lecturers agree with the e-CMS application and understand the e-CMS's usefulness for their work; and it will be more helpful if the system is easy to use. Most of lecturers in this study's respondents suggested PCU management to do an aggressive socialization about the existence and guideline to use the e-CMS application, and provide supported department for maintaining the reliability and validity of system.

Conclusion

This study was conducted to evaluate lecturers' acceptance of e-CMS using TAM. Based on data collected from 40 lecturers, the utility of TAM for explaining lecturers' acceptance of e-CMS was examined. The overall result obviously shows that perceived usefulness has the strongest effect on intention to use, whether it is direct or indirect through attitude toward using. This outcome is in accordance with previous research (Davis, 1989) found that attitude toward using was a partial intermediary of perceived usefulness effect on intention to use, and added little causal explanatory power. However, the results of perceived ease of use in this study only has significant effect on perceived usefulness and not significant on attitude toward use. These results are contrary to the prior study where both constructs have significant effect on attitude toward use simultaneously. Therefore, the only path of perceived ease of use to effect intention of use is through perceived usefulness.

Based on those results, there are two conclusions on lecturers' acceptance of e-CMS in PCU. First, lecturers will use e-CMS as a supported teaching tool if they see it to be useful in enhancing their effectiveness in teaching, improving their courses performance and increasing their productivity in managing their courses. Second, comparing to the ease of use (user-friendly), usefulness is the major concern of lecturers in using e-CMS. Lecturers might be willing to learn and accept difficult system in order to obtain the optimum usage. Contrary, lecturers would not give attention to learn e-CMS that is easy to use with minimum supportive usage.

Nevertheless, this study has two limitations, the small sample size and the generalization of e-CMS. Many of PCU's lecturers that did not reply the questionnaires, do not use e-CMS. They are confused to choose which system is suitable for them and there is no management policy that requires them to use e-CMS. Furthermore, this study observed the acceptance of e-CMS in general, not specific e-CMS in PCU (e-course, PCU Camel, and Lentera). It indicates that e-CMS implementation in PCU is not integrated. However, these limitation indeed support the conclusion, in term of the lecturers that use e-CMS merely because the usefulness.

As a recommendation, future study to evaluate e-CMS implementation in several universities in Indonesia is important to support the improvement of learning environment in the country, not only from lecturers' perspective, but also from other users' perspective (student and management).

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