FACTORS DETERMINING STUDENTS' INTENTION TO ADOPT E-LEARNING AN EVIDECE FROM INDONESIA HIGHER EDUCATION CONTEXT

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ABSTRACT

The study aimed to address the question: what are the factors determining students' intention to adopt e-learning in higher education and what are the relationships among these factors? This study investigates and identifies factors affecting higher education students' intention to adopt e-learning in higher education institutions in Indonesia context. The data drawn from university students in West Sumatra Province, Indonesia. There are four universities which has applied computer and internet in the management information system to participate in the study. E-learning adoption is approached from the information systems acceptance point of view. This study an extended version of the Technology Acceptance Model (TAM) was developed to investigate the underlying factors determining intention to adopt e-learning in higher education students. Those factors are management support, perceived ease of use, and perceived usefulness. The data gathered from a survey of 200 undergraduate universities students, who were using the e-learning system at their universities. The model was estimated using Structural Equation Modeling (SEM). A path model was developed to analyze the relationships between the factors to explain higher education students' intention to adopt e-learning system. Implications of the study also discussed in this research.

Keywords – e-learning, intention to adopt e-learning, management support, Technology Acceptance Model (TAM).

Introduction

Information technology to support educational system becomes an essential tool to improve student's knowledge and accessibility to sources of knowledge. Major challenges of government in education sector include access issues, i.e. being able to provide education to everyone in which education still being in responsibility of the public sector. These challenges might be faced by applying e-learning in higher education institutions or universities (Ngai et al., 2007). E-learning can be viewed as combination, implementation and relationship of the activities for learning and teaching via different electronic media such as in distance and open learning, etc (Tuparova,Tuparov, Karastranova and Peneva, 2006).

E-learning can be used as one of learning method in student-centered or learner centered. The used of E-learning can maximize and motivate the lecturers to improve the quality of learning process and the quality of course materials. The used of e-learning also can increase the Independence of the students, and increase the communication intensity level of the students and the lecturers. Thus, e-learning can increase the effectiveness and efficiency in learning process (Suyanto, 2005; Ali, 2004; Soekartawi, 2002; Mulvihil, 1997).

The term e-learning would incorporate all educational activities that are carried out by individuals or groups working online or offline, and synchronously or asynchronously via networked or standalone computers and other electronic devices (Naidu, 2006). Asynchronous e-learning happens when participants (lecturers and students) cannot be online at the same time. Meanwhile synchronous e-learning supported by online media, thus the participants have interaction in real time (Hrastinski, 2008).

The current research describes e-learning as learning facilitated and supported through the utilization of information and communication technologies (ICTs) (Jenkins & Hanson, 2003). It includes use of ICT based tools (e.g. Internet, computer, telephone, e-mail, university portal, video, and others) and content created with technology (e.g. animations) to support learning activities (Gilbert & Jones, 2001; Suyanto, 2005). Adoption of e-learning by students in an educational system is a function of their readiness for it, especially if they are satisfied with the terms of service of the e-learning programme/platform. This will in turn, determine the extent to which e-learning reaches its full potential. The higher education institutions as provider of e-learning might be faced with the problems the degree of acceptability of their e-learning program among potential users (Eke 2011).

The understanding of one's ability to accept technology in an online environment is thought to be a starting point of information technology used (Meli. 2008). The most common is acceptance technology model. Technology acceptance model (TAM) which developed by Davis (1989) is regarded as a model that able to explain the individual's acceptance of information technology. TAM posits that individual's actual system use is determined by behavioral intentions, and the behavioral intentions are determined by attitudes toward using. TAM has received considerable attention in the information system field by predicting and explaining IT usage intention and behavior (Yu et al., 2005).

Development and delivery of e-learning need more understanding of how students perceives to e-learning along with how management support influence students perception. Therefore, it is necessary to conduct research that deals with students'

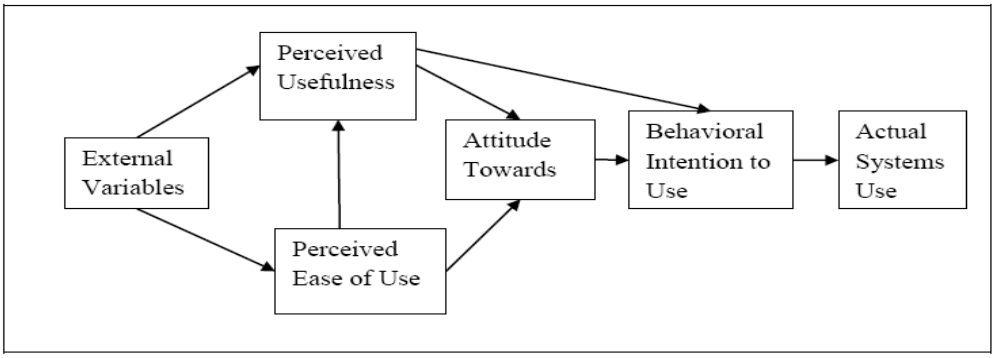
perception of management support, perceived ease of use (PEOU), perceived usefulness (PU) and its influence students' intention to adopt e-learning in higher education. The impact of intention to the actual usage of a technology will not included in this research because of there is still limited data of e-learning usage in higher education students at West Sumatra.

The current research purposes to exam the model which explains factors influencing students in higher education institutions to adopt e-learning. Those factors included management support, perceived ease of use, and perceived of usefulness. The model proposed on the basis of developing body of knowledge in existing literature. In terms of structure, the remainder of this paper develops as follows. The next section provides a theoretically sensitizing literature review relevance to adoption of e-learning. This is followed by a methodology section, in which quantitative research strategy used in the study to answer the hypotheses proposed. The model was examined using structural equation modeling (SEM). The subsequent section elaborated the findings of testing hypotheses on the basis of output from AMOS application. The discussion section situates the arguments to support hypotheses proposed in the model. Finally, the concluding section puts forward implications to improve e-learning in higher education institutions.

Literature Review and Hypotheses

The TAM proposed by Davis et al., (1989), is shown in figure 1. In TAM2 Venkatesh and Davis (2000), removed the attitude variable from the previously model, as it does not fully mediate the relationship between PEOU and PU to behavioral intention. According to Ong et al. (2004), the e-learning system is relatively new IT, the existing of TAM cannot fully explain affect of intention to the usage of e-learning systems. In West Sumatra itself, e-learning has already known and use as one of a new way to complete the learning process at some of higher education institution even though in limited amount of usage. Thus, since the amount of e-learning usage is limited and limited information about the actual usage of e-learning in West Sumatra, the researcher will not include the actual usage variable into the research. This research is more proposing a direct effect of "perceived usefulness" and "ease of use" on intention.

Figure I. Technology Acceptance Model



Source: Davis et al., (1989)

Perceived Usefulness (PU) and Intention to Adopt E-learning

The PU construct of TAM has been used extensively in IS research, and has strong empirical support as n strong determinant of usage intentions (Kim et al., 2007). PU is defined as the individual's perception that using the new technology will enhance or improve her/his performance (Davis, 1989). Specifically, it refers to effectiveness at work, productivity (time savings) and the importance of the system for the individual's work. Similarly, Davis (1989) found that PU has much stronger effect on intention to use or actual use of information and technology than PEOU. Additionally, Igbaria et al. (1995); Igbaria et al. (1997); Agarwal & Karahanna (2000); Venkatesh & Davis (2000); Moon & Kim (2001); Selim (2003); Hong & Tam (2006); Chan & Teo (2007), Ngai et al. (2007); Chatzoglou et al. (2010), also reported that perceived usefulness is significant and positively influences the intention to adopt a technology. A study conducted by Khalili and Eskandari (2015) in the context of adoption information communication and technology (ICT) for students in India found that perceived of usefulness as determinant of attitude toward e-learning. It can be argued that perceived of usefulness as an antecedent of adoption e-learning. Eke (2011) supported that perceived usefulness as one of several predictors that can be used in modeling a student intention to adopt e-learning.Therefore, the following hypothesis is proposed:

H1: Perceived usefulness of e-learning usage will have a positive effect on intention to adopt e-learning.

Perceived Ease of Use (PEOU) and Intention to Adopt E-learning

PEOU is as a degree to which a person believes that using a particular system would be free from effort. PEOU represents the degree to which a system perceived not to be difficult to understand, learn, or operate (Davis, 1989). As well as PU, PEOU also take a big part in shaping the user behaviour in using e-learning (Chatzoglou, 2010). In short, the PEOU associated with the user-friendliness of the systems in using e-learning and that e-learning itself. Similarly, Gefen (2003), Ma & Liu (2004), Hong & Tam (2006), Chan & Teo (2007) also found that PEOU has significant impact to the individual's intention to adopt a system. PEOU has appeared as significant factors in literature on e-learning systems (Ngai et al., 2007; Selim, 2003). Elliott and Fu (2008; c.f. Al-alak & Alnawas, 2011) noted that perceived ease of use helps in reducing the uncertainty of innovations leading individuals to adopt e-learning technology. PEOU was discovered to indirectly influence intention to use through increased perceived usefulness (PU) and A study conducted by Teo (2009) found that perceived usefulness mediates the impact of PEOU on attitudes forwards use. Developing body of the literature above will lead to the following hypotheses:

H2: Perceived ease of use of e-learning usage will have a positive effect on intention to adopt e-learning.

Perceived Ease of Use (PEOU) and Perceived Usefulness (PU)

TAM also incorporates a causal relationship between PEOU and PU, advocating that a system would be perceived to be more useful if it is easier to use (Vijayasarathy, 2004; Lin & Wu, 2004; Raaij & Schepers, 2006; Chatzoglou et al., 2010). According to TAM, perceived ease of use has direct and indirect effect on consumers' intention. The direct effect is explained by the fact regarding the ease of use means using a system will make them free of effort (Venkatesh, 2000). The indirect effect is through usefulness that is influenced by ease of use, because the easier a technology is to use, the more useful it can be (Venkatesh, 2000; Davis et al., 1989). The perceived ease of use of e-learning is defined as the degree to which an instructor believes that the system will be used easily (Davis et al., 1989). Davis (1989) concluded that PEOU has a significant direct effect on PU, and most of the recent studies verified the relationship empirically in the context of e-learning use (Lee et al,. 2011). Therefore, the following hypothesis is proposed:

H3: Perceived ease of use of e-learning usage will have a positive effect on perceived usefulness.

Management Support

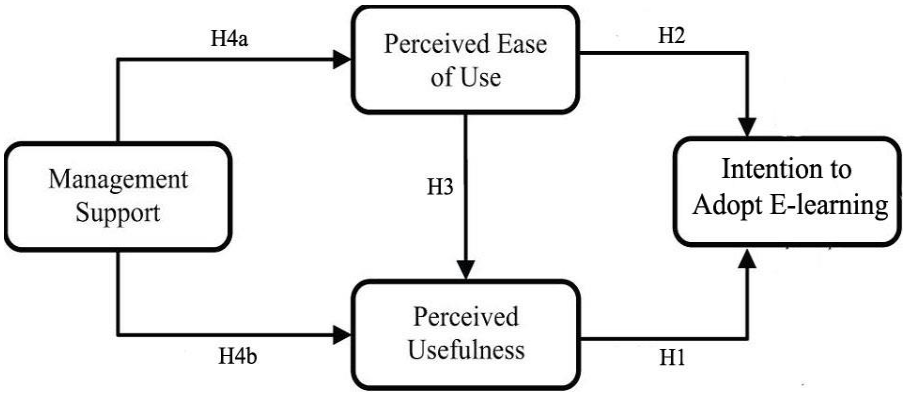
Management support has been argued to influence system success by influencing individual's perceived ease of use and perceived usefulness of a system (Igbaria et al., 1997; Lee et al., 2005). As organizational decision makers, management have to identify the role of IT and IS should play in their organization, to make decisions whether and when an innovation is worth adopting into the organization (Igbaria et al., 1995; Igbaria et al., 1997). Al Mamary (2014) supported that top management has positive effects on technology acceptance and without its support the organization will face problems in developing, planning and usage of IT. Top management support creates a more conducive environment for IS success (Igbaria et al 1997). Therefore, management support is associated with greater system success and lack of it is considered a critical barrier to the effective utilization of IT. Thus, the following hypotheses as proposed:

H4a: Management support will have a positive effect on perceived usefulness of e-learning usage.
H4b: Management support will have a positive effect on perceived ease of use of e-learning usage.

The Research Model

Based on the hypotheses above and the hypothesis, the researcher built a theoretical model of the research as follows:

Figure 2. The proposed research model and hypotheses



Methodology

Sampling and Data Collection

The target population in this research are college students from four universities in West Sumatra. Those four universities consist of two state universities and two private universities in West Sumatra Province. Those four universities are chosen because they have used online academic information system already and has big amount of college students at West Sumatra Province. In order to achieve a sufficient sample size, the researcher distributed 200 questionnaires to higher education students who take bachelor degree at those four target universities. Therefore, the samples taken from each of universities are 50 respondents, thus the total samples are 200 samples. Moreover, the sampling method used in this research was convenience sampling because of the limitation of research time. The demographic characteristics of the sample are presented in the Table 2.

Measurement Development

A structured questionnaire was used in this study to collect data of students in higher education institution in West Sumatra Province. The questionnaire consists of four sections: perceived usefulness, perceived ease of use, management support, and intention to adopt e-learning. All of these variables used 5 point Likert's scale to measure all these variables which range from 1 (strongly disagree) to 5 (strongly agree). The variable perceived usefulness was measured by using 6 items developed by Davis (1989). It will derive list of items of perceived usefulness: The sample items such as: 1) Using e-learning would enhance my

learning effectiveness, and 2) I would find e-learning useful in my learning activity. The variable perceived ease of use was measured by using 6 items developed by Davis et al. (1989). The sample items are: 1) Learning to use e-learning would be easy for me, and 2) I would find e-learning easy to use. The variable management support was measured by using 4 items developed from e-learning adoption survey. The sample items are: 1) The university strongly encourages the use of e-learning in learning process, and 2)My department is committed to support my efforts in using e-learning in learning process. Then, the variable intention to adopt e-learning will be measured by using 3 items developed by Ventakesh et al., (2003). The sample items of intention to adopt e-learning are: 1) I intend to use e-learning in the next semester, and 2) I plan to use e-learning in the next semester.

Statistical analysis

The research model was tested using structural equation modelling (SEM), with latent variables (AMOS 18). The data were analysed using the two-step approach suggested by Anderson and Gerbing (1984). In the first step, a confirmatory factor analysis was performed, which helps to assess the adequacy of the measurement model, while in the second step of the data analysis the structural model was tested using SEM. The Table 2 showed lists the questionnaire constructs and their operational definitions, the items used to measure each construct, and the related literature.

Data Analysis

The questionnaire will be used as the instrument in this research to get the variable research data. The statistical tools which are used in this research are SPSS 19 and Structural Equation Model (SEM) by software AMOS 18 This software provides information about goodness-of-fit model and relationship among the hypothesis. SPSS is needed to analyze the respondent characteristic in represent the frequency and percentage of respondent data. Beside that this tools also used to determine the validity, reliability, and also normality of this research.

The question of each variable is tested by factor analysis with factor loading must be more than 0.4 based on statistic book by Hair et al. (1998). A greater absolute value of factor loading will lead to the better the measures of underlying property or construct. From the table above all items of each variable are greater than 0.50, it means all items are significant and valid in this research. Cronbach's alpha was used to compute the reliability of scale of each construct's usual lower limit for cronchbach's alpha is 0.7 (Hair et al., 1998). Based on the analysis of the reliability, the result shows that the value of cronbach's alpha for each variable is greater than 0,7 and less than 0,90 which means the data is reliable to be processed.

Table 1. Operational Definitions

Variable	Definition	Sub Variable	Number of Item	Source
Perceived usefulness	The degree to which a person believes that using e-learning would enhance his/her job performance.	Perceived Usefulness	6 Items	Davis (1989)
Perceived Ease of use	The degree to which a person believes that using e-learning will be free of effort.	Perceived Ease of use	6 Items	Davis (1989)
Management Support	Management support defined as perceived level of general support offered by top management, including encouragement and resource support.	Management support	4 Items	e-Learning adoption survey (accessed on: http://elearningfundi.net/survey/index.php?sid=37667)

Intention to adopt e-learning	Intention is a determination to act in a certain way or to do a certain thing. Intention to adopt e-learning means that a determination to use technology of e-learning in learning process.	Intention	3 Items	Ventakesh et al. (2003)

Table 2. Respondent Characteristics

Mean (SD)	Range	Frequency	Percent
Gender	Male	104	52%
	Female	96	48%
Period of using internet	< 1 year	4	2%
	1 - 5 years	86	43%
	6 – 10 years	89	44.5%
	>10 years	21	10.5%
Frequency of using internet in a week	1x	8	4%
	2x	7	3.5%
	3x	18	9%
	4x	16	8%
	5x	27	13.5%
	6x	20	10%
	7x	104	52%
Internet function	Academic	88	44%
	Commercial	7	3.5%
	Entertainment	63	31.5%
	Communication	35	17.5%
	Others	7	3.5%
Intended use of using internet in learning process	To do assignment	114	57%
	Learning activities in the class	4	2%
	Complementer of class material	78	39%
	Others	3	1.5%
Definition of e-learning	Learning activities through internet media based	187	93.5%
	Learning systems build to make communication between students and lecturers becomes easier	6	3%
	A learning subject through internet	5	2.5%
	A learning subject about electronic system	2	1%

Testing of Normality

To get the value of normality, the researcher used SEM AMOS. Ferdinand (2002), suggested that the data will be normal if the value of cr for skewness and kurtosis in SEM AMOS should be < 2.58 . The result from the table 3 indicates the normality of the data. Because all of the cr value of the data is < 2.58 means all of the data is normally distributed.

Table 3. Normality Testing

Variable	Min	Max	skew	c.r.	Kurtosis	c.r.
PU1	3.000	5.000	.049	.282	.099	.286
PU2	3.000	5.000	-.024	-.139	.506	1.462
PU6	3.000	5.000	-.045	-.257	-.284	-.819
PU5	3.000	5.000	-.069	-.398	-.377	-1.089
PU4	3.000	5.000	-.012	-.072	-.530	-1.531

Variable	Min	Max	skew	c.r.	Kurtosis	c.r.
PU3	3.000	5.000	.009	.050	-.100	-.288
I1	3.000	5.000	.016	.092	.121	.350
I3	2.000	5.000	-.186	-1.076	-.377	-1.088
I2	3.000	5.000	-.242	-1.396	-.641	-1.851
PEOU1	3.000	5.000	-.361	-2.087	1.167	3.369
PEOU2	3.000	5.000	.000	.000	2.000	5.774
PEOU6	2.000	5.000	-.402	-2.321	.845	2.440
PEOU5	3.000	5.000	-.006	-.032	-.112	-.324
PEOU4	3.000	5.000	-.235	-1.359	.413	1.191
PEOU3	2.000	5.000	-.211	-1.221	.380	1.097
MS1	2.000	5.000	-.394	-2.274	.047	.136
MS4	2.000	5.000	-.139	-.801	-.252	-.728
MS3	2.000	5.000	-.304	-1.754	-.177	-.510
MS2	1.000	5.000	-.061	-.350	.430	1.241
Multivariate					98.734	24.715

Table 4. Evaluation of SEM with Goodness of fit Measure

Types of Measure	Goodness of Fit Measures	Recommended Level of acceptable Fit	Results of the research	Note for Testing Model
Absolute Fit Measure	(GFI) (RMSEA)	Greater than .90 Under .08	0.865 0.067	Moderate Acceptable
Incremental Fit Measure	(AGFI) (TLI) (NFI) Comparative Fit Index	Greater than .90 Greater than .90 Greater than .90 Greater than .90	0.826 0.903 0.840 0.917	Moderate Acceptable Moderate Acceptable
Parsimonious Fit Measure	Normed chi-square (χ2/df) AIC	Lower limit 1.0 Upper limit 2.03/ 3.0 or 5.0 Smaller positive value indicate parsimony	1.88 363.127	Acceptable

Source: Tabachnick and Fidell (2000); Hair et al (1998); Byrne (2000); Gefen et al. (2000); Joreskog & Sorbom (1986).

There are some indicators in moderating fit model (see Table 4) included GFI; AGFI; NFI. This research do not need to revise this model as GFI; AGFI; NFI is demonstrate marginally acceptable when the value is larger than 0.80 (Joreskog & Sorbom, 1986; Gefen et al., 2000; Bentler & Bonett, 1980). It means according to the value of each indicator, this model doesn't need to be revised or the fit model is acceptable.

The Results of Testing Relationship among Variables

Table 5. Regression Weight

H	Path	Estimate	SE	CR	P	Judgment
H1	PU ← Intention to Adopt E-learning	0.731	0.189	3.859	***	Significant
H2	PEOU ← Intention to Adopt E-learning	0.231	0.129	1.787	0.074	Not Significant
H3	PU ← PEOU	0.562	0.095	5.939	***	Significant
H4a	PU ← MS	0.022	0.081	0.276	0.782	Not Significant
H4b	PEOU ← MS	0.504	0.136	3.696	***	Significant

Note: *significant at p<.05, **significant at p <.01.

Figure 3. The Final Investigated Model

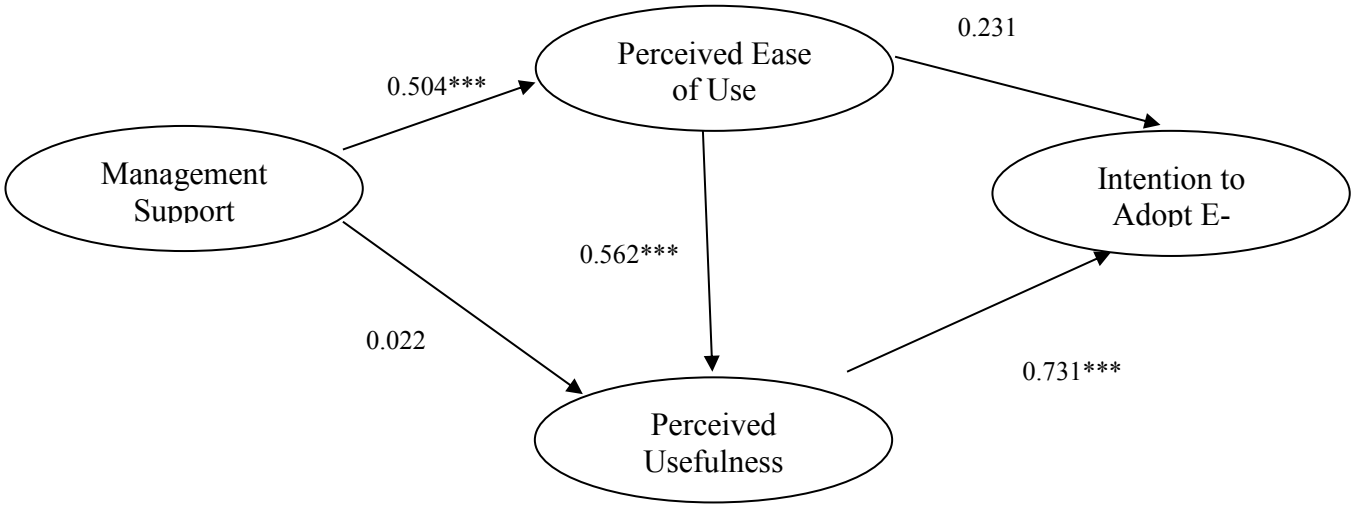
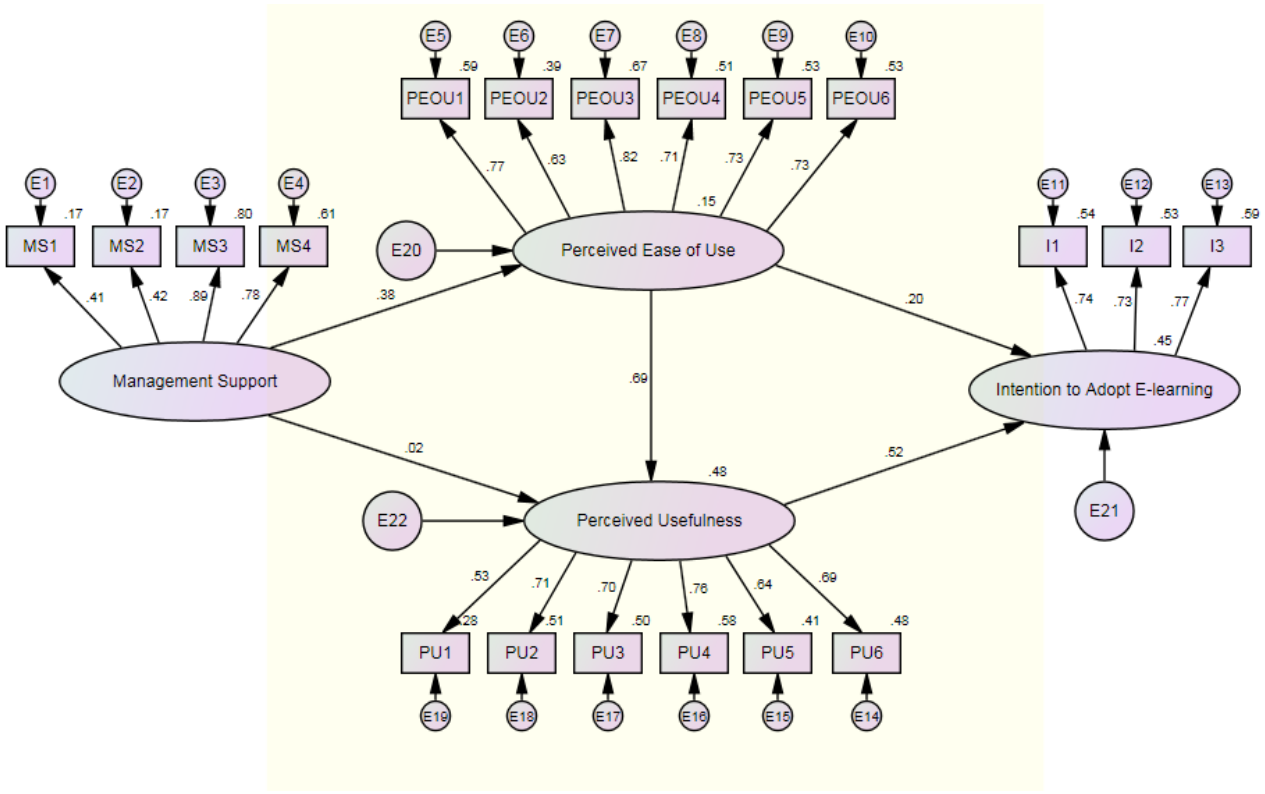


Figure 4. Standardized Estimates



Discussion

The results reflect that student's intent to use internet through PU of the e-learning. There are many previous studies who have researched relationship between PU and intention (Venkatesh & Davis, 2000; Moon & Kim, 2001; Hong & Tam, 2006; Chan & Teo, 2007; Chatzoglou et al., 2010). PU plays significant role in building perception of students to adopt e-learning, the usefulness leads on how the students can improve their performance, effectiveness, and productivity through e-learning. Nowadays students has to develop their study achievement as well, by gaining and explore the data and information, they can analyze what they should do to improve their study achievement. Students could accessed the information and might be safe their time and capital to gain an important information in order to develop their knowledge and skill and improve their productivity in learning process. Consequently, the perception of e-learning usefulness positively impact on students' intention to adopt e-learning.

The result shows that PEOU does not have a significant impact on students' intention to adopt e-learning. It may relate on respondent characteristic on education level, all of them are higher education students where usually people in their age does not really take the hardness level of a system as a problem as long as that system has a function for them. Beside that from respondent characteristic on period of using internet, almost the respondent had been using internet for more than five years, which means the respondent had familiar with way to use internet that support them to adopt e-learning in their learning process.

The test results also found that PEOU has positive influences on PU in adopt e-learning. This finding support previous literature which stated that many researchers who have studied the relationship between PEOU and PU (Davis, 1989; Moon & Kim, 2001, Chatzoglou et al., 2010; van der Heijden et al., 2001; Vijayasarathy, 2004).

Moreover, if rely to the theories there is empirical evidence accumulated that PU mediates the effect of PEOU on intention (Chatzoglou et al., 2010; Moon & Kim, 2001). Because the easier a technology is to use, the more useful it can be. The easier and more effortless a technology is, the more likely the students intend to use this technology of e-learning.

The result of the research demonstrated that management support was not significant influence on how students perceive usefulness in adopting e-learning. The insignificant result may caused of e-learning is a new tools for the universities to apply in learning process. Therefore, management parties at the universities still in introducing and adoption process to e-learning. The application of e-learning usage at these four universities also limited just for download the class material and searching for class assignment through internet. Meanwhile, there is still several ways to apply e-learning in learning process, for example students can learn through video, text based conferencing, video conferencing, mailing list and others. Besides, there is no direct explanation from the management of the universities to the students about e-learning, thus the students do not know in deep about the usefulness and function of e-learning. The non-significant result also may be caused of the universities lack of information technology (IT) assistance that can help the students in maximizing the function of e-learning in their learning process.

Meanwhile, management support has significant influence on e-learning perceived ease of use. Therefore, general implication of this research lead in higher education institution's intention on how they provides facilities and others tools which can give significant contribution for students to adopt e-learning in their learning process. Institution may provide any education for higher education students in order to increase their knowledge and skill in using e-learning in their learning process. Through this education program, students can get any information about e-learning.

Conclusion

The purpose of this study was to investigate the factors determining intention to adopt e-learning in higher education students. The primary purpose of this study was to develop and test the model of the variables which contribute to students' intention to adopt e-learning in higher education students. A theoretical model was generated which was then tested using structural equation modeling (SEM). The result of SEM analysis demonstrated that perceived usefulness has significant influence in higher education students' intention to adopt e-learning, and management support has significant influence to perceived ease of use. Furthermore, perceived ease of use has a positive relation to perceived usefulness. Otherwise there are also several hypotheses which are rejected like perceived ease of use was not significant influence in intention to adopt e-learning and management support did not significantly affect perceived usefulness.

The current study provided several implications to increase adoption of e-learning toward improvement of learning process in higher education. Management parties also can cooperate with the lecturers or class instructor to introduce e-learning to the students and to support students to adopt e-learning through their learning process. In specific the implication of this research may lead to contribution from student union at the university to conduct any activities to help the management to introduce e-learning to the students. Student union can cooperate with the management of university to conduct some program relate to e-learning.

The management should provide supporting tools such as computer which has already connected to the internet to facilitate students in accessing information related to their study easily in campus. Beside that, management may provide audio visual equipment in a class, so the students not only adopt e-learning based in internet, but they also can learn through video or record from compact disk (CD), video compact disk (VCD), and others.

Internet access is a significant factor to improve the intention of higher education students in conducting their learning process based on technology advance. Management may provide free access Wi-Fi in some area at campus in order to ease the students to access internet. Moreover the most important thing is the institution pasties should socialize about the facilities given for students to let the students know that they can maximize the function of facilities given for them. The management should providing instructors with technical support, in form of computer specialists, instructional design specialists and trained assistants. It is essential to students' intention to adopt e-learning. Through this support, the management party of universities shows the students that the management is serious with the effort to develop the learning system at the university and they support students' activities to adopt e-learning in their learning process.

Furthermore, personal imitativeness from the students is another important issue that must be highlighted in the adoption of e-learning. Innovative people may realize the usefulness and the ease of use of new systems more quickly than non-innovative people (Schillewaert et al., 2005). So, students as the agent of change need to be more critical in choosing any tools that can improve their study achievement and students also need to be more active in their learning process.

It is also necessarily to consider the limitations of the reported research findings. Although the research has been designed using SEM which seemed to be appropriate to test the proposed model, the direction of causality is somewhat difficult to interpret as the data were collected at a single point in time rather than longitudinal data. Secondly, the data collection of this study relied on self-reports. All variables in the study were measured from the same respondents and attempts were made to interpret their correlational nature, thus, common method variance problems could emerge to affect the correlation among variables. Finally, the data collecting technique was used non probability random, therefore it could affect the results.

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