Structural Model of Critical Success Factors The Success of *E-Learning* Implementation In Private Colleges-University in Palembang

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Abstract ⸺**Electronic learning (e-learning) is the latest information technology used by many colleges to improve and enhance the learning process as a competitive advantage in order to achieve the vision and mission of the college. Conventional learning process gradually abandoned because the students have to change the way of learning so that the learning process to be efficient and effective by *e-learning*.**
The purpose of this study was to determine *the critical success factor (CSF)* or critical success factors that affect the success of the implementation or application of e-learning, and to model structural CSF factors.
The study used *Structural Equation Model (SEM)*, the population of the study was all students and lecturers of private colleges majoring in computer science and use e-learning. Conducting literature review to obtain the key factors of success, making the research structural models that can be continued for subsequent analysis. Determining hypothesis critical success factors, techniques for data collection were a questionnaire, Likert scale was presented in figures 1 to 5 defined ranging from strongly agree, agree, disagree, and strongly disagree, a quantitative statistic was used to obtain primary data.
The results provided a structural research model related to the data available in the case study of this research. Further research of structural model can be used to analyze the correlation / regression of exogenous factors and endogenous factors.

Keywords⸺ *CSF, SEM, E-Learning*

I. INTRODUCTION

In carrying out the study in the college-university, the college must utilize and integrate information technology in teaching and learning as a strategy to meet the needs of students [1][2]. Information technology is able to change the traditional paradigm of teaching and learning in colleges became not only more sophisticated, effective and efficient but also improve the ability of colleges in making teaching materials, delivery of materials, as well as communication with the student [1][6].

There are a few things into consideration why e-learning is adopted and implemented, for instance, because e-learning is a relatively easy to distribute teaching materials, learning materials in e-learning can also be updated quickly, and e-learning is also accessible by more than one user [1][3]. For students who are unable to come during lectures due to illness, business, work, and so forth into a strategy to align the understanding of the course material with other students who attended the lecture.

1. LITERATURE REVIEW AND DEVELOPMENT OF HYPOTHESES

A. *E-Learning*

E-learning is learning through electronic media, such as the Internet, intranets, extranets, satellite broadcast, audio / video, interactive TV, and CD-ROM [1][2]. E-learning is a means of education that incorporates self-motivation, communication, efficiency, and technology [1][2][3][4].

B. *E-Learning Features*

E-learning has the following features [8]:
a. The relevant contents related to the purpose of learning use instructional methods, such as giving examples and practice to help learning process.
b. Using media elements such as words and images to distribute the contents and methods of learning.
c. Learning process can be directly between the instructor (synchronous) or individual learning (asynchronous).
d. Improve new insights and techniques related to learning objectives.

C. *Elements of E-Learning*

Definition of E-Learning has some elements of what, how, and why e-learning [8]:

1. *What.* E-learning includes contents consist of information, and instructional methods, which helps people learn the content of learning
2. *How.* E-learning is distributed through computers in the form of words and images. The distribution can be asynchronous learning related to individual learning or synchronous designed related to guidance from the instructor directly.
3. *Why.* E-learning is intended to help students achieve learning goals or perform their work.

D. Factors of The development of E-Learning

In general, the factors driving the development of e-learning as follows [9]:

1. Technology Push-points, technology that encourages the development of e-learning: VLEs and MLEs, Portal, Multimedia teaching space equiped, Online Teaching materials, Creating re-usable learning objects (RLO / SCO), WIFI accessibility / Wireless Connection, and The availability of laptops / PCs for students
2. The Demand Pull. Learners' need that are arising today: Cooperation between students, Support for students with the availability of mobile technology (mobile learning), More flexible supervision, One-stop shop for supporting students / staff, The design of new learning environment, Supporting for the self-creation of learning objects, More useful learning objects, and Partnership in developing of learning and teaching objects.

TABLE 1.
REVIEW OF PREVIOUS STUDY[1][2][3][4][5][6][7]

Researchers	Title of the study	CSF
Goldi, DR, Puri (2012)	Critical Success Factors In E-Learning – An Empirical Study	pedagogical, institutional and administrative divisions, technology, evaluation, and interface design.
Hassan M. Selim (2005)	E-Learning Critical Success Factors: An Exploratory Investigation OfStudent Perceptions	instructor characteristics, student's characteristics, technology infrastructure, and university support
Fathurohman, A. (2011)	The Effect of Development of E-Learning Model Learning toward	Lecturer's ability, Design model of e-learning, active students
	Learning Achievement Faculty of Medicine, University of Muhammadiyah Semarang	
Keat Teoh,Kung (2011)	An Examination Of Critical Success Factors In The Implementation Of Eportfolios In Universities	users, infrastructure, learning approaches and teaching pedagogy, community, Social Presence (social networking), and pleasure
Cheng,C. Lin (2011)	Re-Examining The Critical Success Factors Of E-Learning From The EU Perspective	Organization, technology, relationships in e-learning content, the common factor
Eko, J. Istiyanto, dkk.(2010)	Critical Success Factor of E-Learning Effectiveness in a Developing Country	Information Technology Penetration, good IT management, engagement management, user involvement, adequacy of financial resources, government policy

II. STRUCTURAL EQUATION MODEL (SEM)

A. Definition of SEM

SEM is a statistical analysis tool, combination of factor analysis and regression, modeling the relationship between the variables of research [10][11]. SEM is a multivariate statistical technique which is a combination between factor analysis and regression analysis (correlation) to examine the relationships between the variables that exist in a model, whether among the construct indicators (variable), or the relationship between the indicators [10][11] .

SEM method has flexible properties because researchers are able to draw various models according to research. The flexibility makes many variations of the models tested through SEM. The following describes some of the models often used by researchers [10][11]:

1) Confirmatory Factor Analysis Model

Confirmatory factor analysis Model (CFA) is a model that contains a pure measurement model. The goal is to identify the exact model that describes the relationship

between a set of items with the construct being measured by the items.
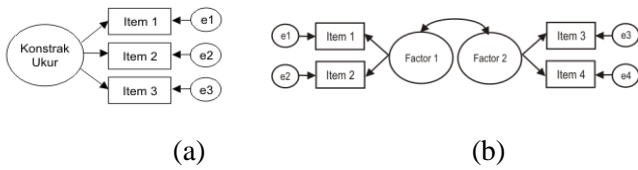

(a)   (b)

Figure 1. Example of Confirmatory Factor Analysis Model

2)   Regression Analysis Model

The regression model consists of predictor and criterion of which is empirical construct. Empirical construct can be a total score of measurement results consisted of one or several measurement items. Regression model in Figure 2.a by using AMOS will produce SPSS analysis because the model is a standard model that consists of a regression predictor and criterion. Other regression model in Figure 2b which is a kind of path analysis with one mediator and the image 2.c regression model with two dependent variables (*bivariate regression*).
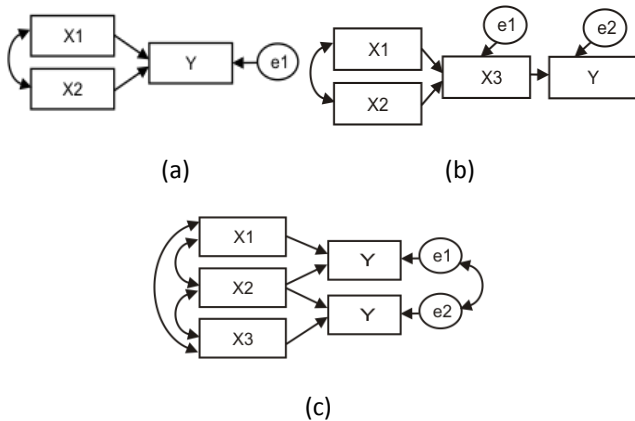

(a)   (b)

(c)

Figure 2. Example of Regression Model

3)   Experiments Model

SEM can be applied to the analysis of data on experimental research. Figure 3 shows a model to identify the attributes change from pre-test post-test. Each attribute is characterized by two items. The difference between figure 3a and 3b lies in the existence of the given data treatment. The experiment model is analyzed separately between the experimental group and the control group but has the accuracy of the information about the model.
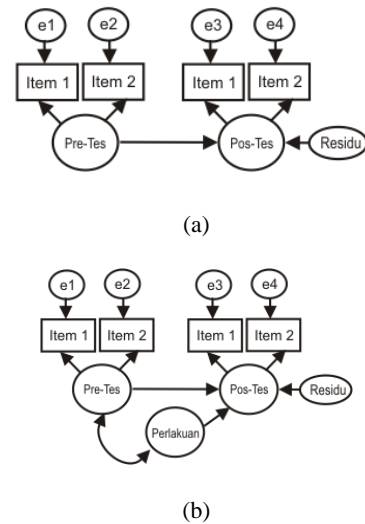

(a)

(b)

Figure 3. The Example of Experimental Model

4)   Full Model

This model called the full model because the combination between the measurement model (factor analysis) and structural model (regression). By this model can be determined the role of the items in measuring the measurement construct and the role of other metrics measuring toward other measurement construct. This model is more challenging because it is relatively difficult to get a satisfactory fit because of the potential errors rise in the model.
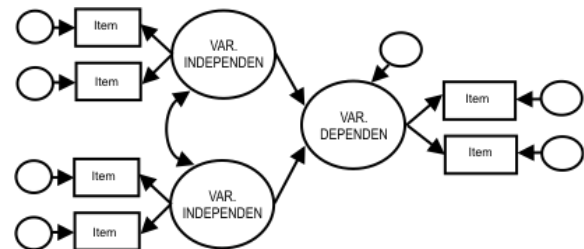

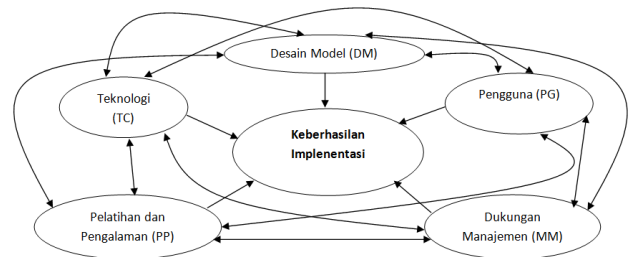Figure 4. The Example of SEM

III. DISCUSSION

Figure 5. CSF research model on e-learning implementation

A. Research Model

In Figure 5 above shows that the correlations between all independent variables, Management Support, Technology, Design Model, Users, Training and Experience. In addition, the correlation between the independent variables with the dependent variable is the success of implementation. The figure above comes from Jiang Yingjie in 2005 modified for this research model.

B. SEM Research Model

In regression study, it only provides regression models explaining the causal relationship between the observed variables, and then the SEM models will explain the relationship between the observed variables with the non-observed variables directly through the indicator.

By seeing the advantages of SEM, it is appropriate to analyze the causal relationship of latent variables and the manifest, and then drafted a model SEM using AMOS version 2.2 as shown in Figure 6. In this figure only shows structural models associated perceptively with the questionnaire data.

Explanation of Pictures:

Latent variable consists of exogenous variables and endogenous variables

Exogenous variables are: X1 (management support), X2 (technology), X3 (design models), X4 (user), and X5 (training and experience).

Endogenous variable is Y (successful implementation).

Indicators or manifest variables:

X11: The Support in e-learning applications.

X12: High commitment in completing the implementation of e-learning applications.

X13: The cost Optimizing, time, and existing employees in implementing e-learning.

X21: Procurement of software and hardware based on the requirements

X22: The ability of the application in uploading and downloading the materials, and assignments.

X23: The reliability and availability of the system.

X31: an application model of e-learning interacts instructors and students.

Figure 6. Model CSF success implementation of e-learning by Structural Equation Model

X32: Having a team for modifying (designing).

X33: The design of e-learning application model according to the learning needs.

X34: Providing convenience for the user after any changes or additions to the service.

X41: activity utilizing e-learning technologies in learning.

X42: The ability to use e-learning applications.

X43: Makes it easy for the user in upgrading to a higher version.

X51: Training / instructions for using e-learning applications.

X52: Users are already accustomed to (active) using e-learning applications.

X53: Users always involves the application of e-learning during the learning.

X54: The new user learn and easy to use e-learning applications.

X61: The quality of e-learning are applied to Private college-university.

X62: Use of e-learning within the learning and teaching process.

X63: Quick response User to users.

IV. CONCLUSION

SEM structural model is very appropriate to provide an overview of causal relationships between observable variables directly, such as management support, technology, design models, user, training and experience. In addition it gives a relationship overview between the direct observable variable with the non-observable variable through the path diagram, both the multivariate and variant.

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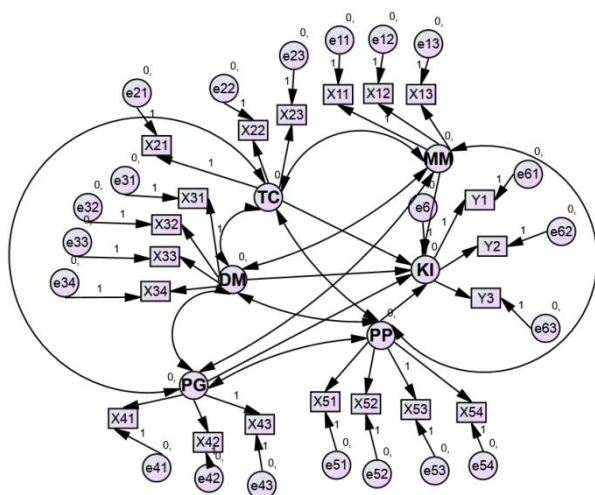
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