Academic Information System Effectiveness Key Factors

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Abstract *- The application of information systems to the organization is expected to help the organization in achieving organizational goals. Measurement of the information system that is run needs to be done to see whether the system is running as expected. In research conducted on this academic information system the measurements were carried out using the Delone McLean model. The Delone and McLean Model proposes 6 key factors that determine the success of an information system, namely Quality of System (QSys), Quality of Information (QI), Quality of Service (QServ), the Use of system (U), User Satisfaction (US) and Net Benefits (NB). In this study conducted on the Universitas Satya Negara Indonesia (USNI) academic information system the results showed that the success of the information system was not influenced by Quality of Information (QI) and the Use of system (U). While the influencing factors are Quality of System (QSys), Quality of Service (QServ) and User Satifaction (US). Testing is done by collecting data from 100 respondents.*

Keyword : *success, academic, information, system, Delone and McLean*

I. INTRODUCTION

The implementation of information technology to support organizational activities has become a fundamental need in facing the global era. The choice of information technology in creating an information system for organizations can produce competitive advantage in the midst of increasingly fierce competition today. Thus an information system can provide added value to the organization.

Universitas Satya Negara Indonesia (USNI) is an educational organization that utilizes information technology to manage organizations. One area that needs to be addressed more thoroughly is the Academic field. Academic Field is one of the main work areas for universities. Universities are not a collection of buildings or physical buildings, but universities are places where the scientific community gathers and interacts to develop knowledge for the benefit of humanity and human civilization. Therefore the academic field is the soul of the university which must always get the attention of the entire academic community. How management of class schedules, student study plans and student study results becomes a very complex problem if only handled conventionally. Management of Academic fields will be more effective and efficient after being assisted with the use of information technology, namely by implementing academic information systems. Of course the application of this information system is expected to have a positive impact on the university rather than just adding to the cost.

To find out whether the information system has been running as expected, it is necessary to evaluate the information system. In the study conducted by Fuad Budiman [1] to measure the success of the implementation of regional management information system he apply Technology Acceptance Model (TAM) approach. Also Junita [2] perform analysis of TAM factors that influence in the use of knowledge management applications in small and medium enterprises of the creative industry. The implementation of TAM is providing general explanations of what determines technology acceptance. In another study the measurement of information system performance was carried out using the Maturity Level Model [3] [4] [5]. Maturity models are intended to determine the existence of existing problems and how to determine the priority of improvement [6]. In a study conducted by DeLone and McLean [8] they suggested that the success of information systems is influenced by variables namely system quality of system, quality of information, quality of service, system usage, user satisfaction and net benefits.

Based on the exposure of previous studies above, this study adopted the DeLone and McLean model to examine key factors for effective academic information systems.

II. RESEARCH METHOD

The type of research that will be conducted in this study is included in the Explanatory research category, namely research that contains evidence that is built through the theory of the approach to the Information System Success Model DeLone and McLean (2003). After that, it was tested using one of the software in this case the AMOS software.

The population in this study was taken from students, lecturers and employees in the Universitas Satya Negara Indonesia (USNI) campus environment with respondents or selected samples namely

students, lecturers and employees who use academic information systems. Samples are taken with a specific purpose and purpose, someone or something is taken as a sample because the researcher considers that someone or something has information needed for research.

While for data collection is done by conducting library studies and distributing questionnaires. Literature study is intended to obtain data or facts that are theoretical related to this research, which is obtained by studying literature, research journals, lecture materials and other sources or materials that have to do with the problems taken. For distributing questionnaires to the research population at the University of Satya Negara Indonesia. According to Ghozali [13] to comply the estimation technique of the Maximum Likelihood model, the number of samples used is at least 100 samples (respondents).

In this study the purpose of developing this theory-based model is to develop a model that has strong theoretical justification, to support the analysis of a problem that is the object of research. The model developed using Structural Equation Model (SEM) based on causality relationships. The strength of the causality relationship between the variables proposed is not in the chosen analytical method, but lies in the theoretical justification to support the analysis.

A. DeLone and McLean Information System Success Model

This study will adopt the Model D & M IS Success Model, with the consideration that this model is quite complete in explaining the variables that affect the effectiveness of an information system. According to DeLone and McLean [7], where have been revised [8], expressed the success of the information system, known as the D & M IS Success Model in 6 dimensions, namely Quality of System: evaluating the information processing system itself, Quality of Information: relating to the output of information systems, Quality of Service: related to the quality of system services, with the use of output from the information system by the recipient, User Satisfaction: related to the recipient's response to the use of information system output, Net Benefit: that is related to the benefits obtained from the use of the system.

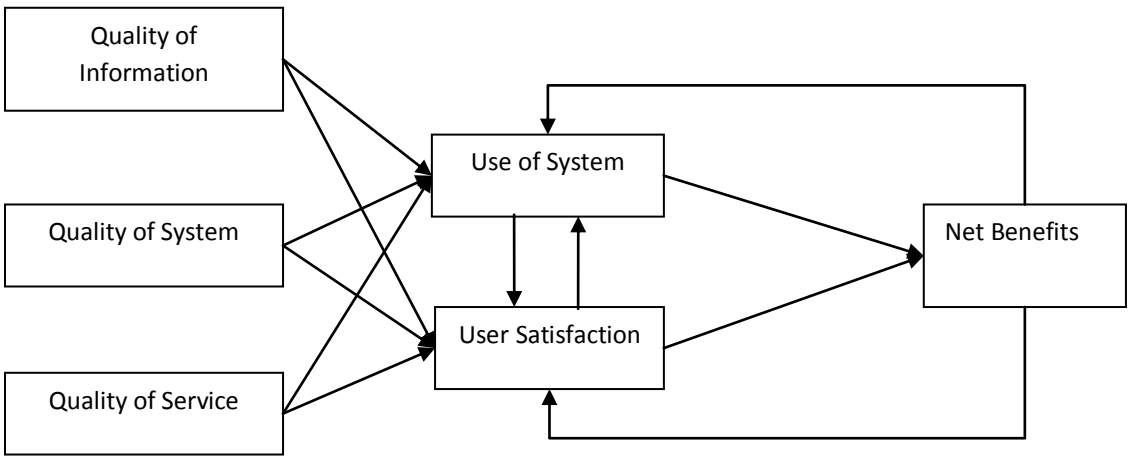

Figure 1. DeLone and McLean IS Success Model

B. Proposed Model

In the research conducted by Livari [9], it provides empirical evidence that the intensity of system use is not an indicator of success in mandatory information systems. So in this study, the proposed theory-based model is the adoption of the modified DeLone and McLean information system success model as can be seen in the following figure :

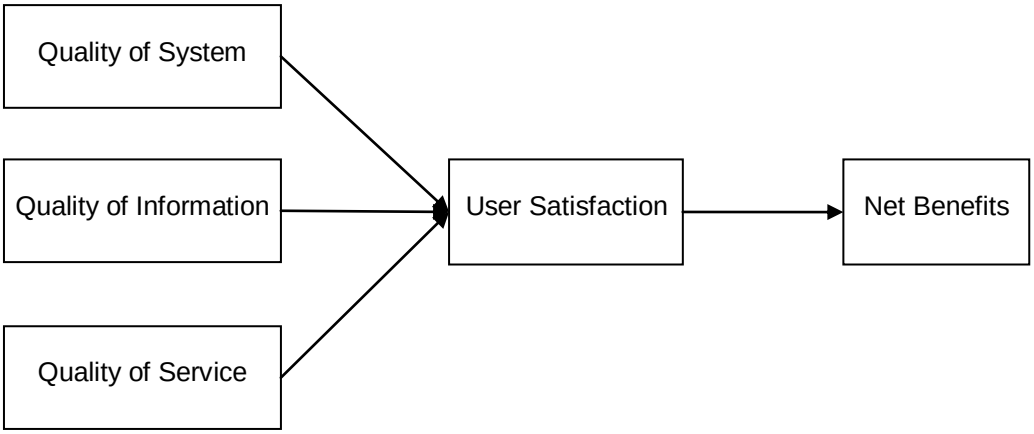

Figure 2. Proposed Model

III. RESULT AND DISCUSSION

A. Respondent Insight

Of the 110 questionnaires distributed by the number of respondents who answered the questionnaire as many as 100 people, the questionnaire was distributed directly. The profile data of respondents who are the object of research can be seen in table 1. below :

Table 1. Respondent Profile

Respondent Classification	Total	Percentage
Profession :		
- Student	70	70%
- Lecturer/Staff	30	30%
Total	**100**	**100%**
Gender :		
- Male	78	78%
- Female	22	22%
Total	**100**	**100%**

From the profile of the research respondents in the profession, most of them were students (70%), while the highest gender was male (78%). In this study the respondents who were the most were students because in terms of quantity the students used the most academic services on the Universitas Satya Negara Indonesia (USNI) campus.

In this study data was collected by survey method through the questionnaire sheet. This research is a research conducted using quantitative data by giving questions - questions made by the author to find out how the influence of Quality of System (QSys), Quality of Information (QI), Quality of Service (QServ), User Satisfaction (US) and Net Benefits (NB) of respondents on the use of information systems for academic services. This study uses a questionnaire instrument made using closed questions. By using closed questions the respondent can easily answer the questionnaire and the data from the questionnaire can be quickly analyzed statistically, and the same statement can be repeated easily. The questionnaire in this study was made using an interval scale or Semantic differential. Variable indicators are shown in the following table :

Table 2. Variables and Indicators

VARIABLE	INDICATOR	Source
Quality of System (QSys)	X1 = System flexibility X2 = System availability X3 = integration completeness X4 = Integration successfulness X5 = Response speed X6 = Response consistency X7 = Error recovery X8 = Recovery completeness X9 = Access convenience X10 = ease to use X11 = Command used X12 = Command ready	[11]
Quality of Information (QI)	X13 = Information consistency X14 = Information availability X15 = Iinformation accuracy X16 = Consistency and accuracy X17 = Actual information X18 = on time information X19 = output simplicity X20 = ease to understand	[11]
Quality of Service (QServ)	X21 = Tangibles X22 = Reliability X23 = Responsiveness X24 = Assurance X25 = Emphaty	[12]
User Satisfaction (US)	Y1 = Easy to use system Y2 = Happy to use system Y3 = informatin availability Y4 = Grows motivation	[11]

VARIABLE	INDICATOR	Source
	Y5 = System flexibility	
Net Benefits (NB)	Y6 = Performance improvement Y7 = Accelerate the task Y8 = Productivity improvement Y9 = Effectiveness improvement Y10 = Easier the task Y11 = Usefull	[11]

B. Result and Interpretation

Since this study purpose is to analyze relationship between variables the researchers use Structural Equation Modelling (SEM) to analyze the proposed research model. SEM is a multivariate statistical technique that is a combination of factor analysis and regression analysis, which aims to examine the relationships among variables that exist in a model [13].

In SEM, Confirmatory Factor Analysis (CFA) measurement intended to confirm that indicator are valid constructor to its latent variable. The result of CFA measurement showed that all indicators estimation above 0.5 which is fulfilled validity criteria (> 0.5) (see table 3) :

Table 3. CFA Measurement Result

Variable	Indicator	Estimate	Validity (> 0.5)
Quality of System (QSys)	X1	.762	valid
	X2	.797	valid
	X3	.571	valid
	X4	.821	valid
	X5	.638	valid
	X6	.922	valid
	X7	.919	valid
	X8	.938	valid
	X9	.995	valid
	X10	.877	valid
	X11	1.003	valid
	X12	1.000	valid
Quality of Information (QI)	X13	1.153	valid
	X14	1.068	valid
	X15	1.020	valid
	X16	1.055	valid
	X17	1.027	valid
	X18	1.295	valid
	X19	.976	valid
	X20	1.000	valid
Quality of Service (QServ)	X21	1.178	valid
	X22	1.341	valid
	X23	.944	valid
	X24	1.058	valid
	X25	1.000	valid
User Satisfaction (US)	Y1	1.002	valid
	Y2	.802	valid
	Y3	1.000	valid
	Y4	.957	valid
	Y5	.898	valid
Net Benefits (NB)	Y6	1.068	valid
	Y7	.965	valid
	Y8	1.079	valid
	Y9	1.072	valid
	Y10	1.017	valid
	Y11	1.000	valid

After finding in confirmatory factor analysis that all indicators are valid to its variable, the next step is to analyze the structural model. At this stage we analyzed the overall model conformity test and the significance of the causality relationship buit into the model. Based on AMOS software calculation we found that Quality of Information have P=0.453 (see table 4) which is above the cut off of 0.05 and negative value in relation with User Satisfaction (see table 5). Quality of Service and Quality of System have a relation to User Satisfaction 0.995 and 0.151 respectively. Furthermore User Satisfaction have a relation with Net Benefits as big as 0.725 (see table 5) :

Table 4. Regression Weights of Research Model

			Estimate	S.E.	C.R.	P
US	<---	QI	-.167	.222	-.751	.453
US	<---	QSys	.151	.154	.978	.328
US	<---	QServ	1.105	.212	5.220	***
NB	<---	US	.719	.111	6.476	***

Table 5. Standardized Regression Weights of Research Model

			Estimate
US	<---	QI	-.146
US	<---	QSys	.151
US	<---	QServ	.995
NB	<---	US	.725

As the result of P=0.51 (see table 4) does not meet the requirement and the negative impact from Quality of Information to User Satisfaction (see table 5) the Quality of Informatin variable will eliminated from the model to modify as the last model. After dropping Quality of Information variable of the last model, the next step is to re-calculate the estimation. The result of the modification model calculation shows that Quality of System and Quality of Service have a relation to User Satisfaction 0.21 and 0.716 respectively. Furthermore User Satisfaction have a relation to Net Benefits 0.64 (see table 6) :

Table 6. Standardized Regression Weights of Final Research Model

			Estimate
US	<---	QSys	.210
US	<---	QServ	.716
NB	<---	US	.640

In the Squared Correlations table (see table 7), the value for user satisfaction is 0.780. This number is a coefficient of determination that shows the magnitude of the influence of quality of system (QSys) and quality of service (QServ) on overall user satisfaction (US). In other words the variable of user satisfaction (US) is influenced by the variable quality of system (QSys) and quality of service (QServ) by 78% and the influence of 22% due to other factors. while the value for net benefit-benefit (NB) is 0.410. This number is a coefficient of determination that shows the magnitude of the influence of user satisfaction (US) on overall net benefits. In other words, the variable net benefits (NB) are influenced by the variable user satisfaction (US) of 41% and the effect of 59% is due to other factors.

Table 7. Squared Multiple Correlations of Final Research Model

	Estimate
US	.780
NB	.410

Overall, the result can be described as follow : Quality of Service and Quality of System have a relation to User Satisfaction although Quality of Service have more strongest relation to User Satisfaction. User Satisfaction have a strong relation to Net Benefits.

Comparing this study to other papers, the results is support previous researches conducted by Livari [9] and McGill [10] that use DeLone and McLean [6] Information System Success Model for measuring successful of information system where the results of DeLone and McLean [6] Information System Success Model implementation were only partially proven.

IV. CONCLUSION

The results of this study can be concluded that the DeLone and McLean Information System Success Model proposed is not fully proven empirically in the case of examining key factors for the effectiveness of information systems at Universitas Satya Negara Indonesia (USNI), where the quality of information (QI) and system usage does not affect the effectiveness of academic service systems at Universitas Satya Negara Indonesia (USNI). While the factors that influence the academis information system are: quality of system (QSys), quality of service (QServ) and user satisfaction (US).

In the future, next research can be done by increasing the number of respondents as well as adding relevant indicators.

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