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Opening Ceremony + Key Note Speakers

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An Identification of Success of Academic System Application Using Delone and McLean Design

(Case Study at Wira Husada school of health science Yogyakarta)

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Abstract—**Academic information system is a system that is very important to be applied to every college, the system is used in order to assist college operators in processing students' grade data, lectures, and lecturers' data. Wira Husada School of health science is one of the colleges that has implemented academic information system, but the system implemented has not worked as it should be. This research aims to identify factors that influence the success of the application of academic information system that has been applied by Wira Husada School of health science using Delone and Mclean design by measuring six variables which are information quality, service quality, system quality, user, user satisfaction and net benefit. Researcher distributes questionnaires to 280 students of Wira Husada School of health science as the main users of the system, and then the data from the questionnaires are analyzed using SPSS and AMOS Program. The result of this research shows that the quality of information and system does not affect the user, but it affects user satisfaction, service quality affects user and user satisfaction, user satisfaction affects user, user affects net benefit and user satisfaction affects net benefit.**

Keywords— *success model, Academic Information System, Delone and Mclean*

I. Introduction

A system that is very important to be applied to a college is called academic information system [1], it is because the use of information system can assist the college to record academic data efficiently, besides it is also useful to improve the performance process and academic quality, and it gives the advantages for the college [2][3][4][5] So, the college can compete in global era. The application of academic information system is used to help college officers in order to process students' grade data, lectures and lecturers' data which usually were done manually. The system applied can decrease the use of operational costs and time in order to conduct academic activities well [1]. The use of information technology in education sector is a must, whether it is for private or state college if the college wants to improve education quality [1][3][6] In addition, by applying information technology, the college can do one of three college obligations that is giving education and teaching well.

To achieve a better education quality, every college that applies an information system needs to know the success level of the applied system [7].The success of the system is an important thing. The application of an information system cannot be categorized effective or successful if it has not improved the performance of the organization that applies it, and its information display is not in accordance with what the users want [8]. Furthermore, this condition should be considered since there many external factors, which will influence the applied system [9]. Other things that also affect the use of the academic information system are the lack of understanding about the current information technology development and social factors in the college [10].

One of the colleges in Yogyakarta that has implemented academic information system as an efficient tool in managing academic data is Wira Husada School of health science. Academic information system which is used is a web-based system that is used in order to manage academic data in the form of online academic achievement record and form of study plan. The design used in this research is Delone and McLean design, because it has been proved successful in testing systems which are applied to education, health, government, library and corporate sectors [6][11][12][13][14][15].
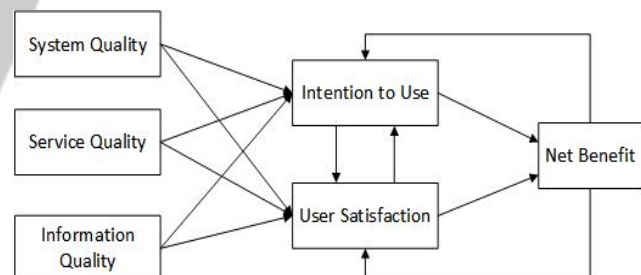
Fig. 1. Design of Delone and McLean 2003

In the beginning, this design only reflected two dimensions of quality, which are system quality and information quality [16], but in 1995, another researcher added service quality as an additional dimension in achieving net benefits [17], then Delone and McLean added service quality as an independent variable. This design is very popular and often used in various research related to the success of an information system, because it is simple and complete. The design reflects the dependence of six measurements of the information systems success [18]. The following chart is the design Framework of Delone and McLean 2003.

This research is aimed to identify the factors which influence success in applying academic information system using Delone and Mclean 2003 design framework by considering six indicators that are information quality, service quality, system quality, user satisfaction, intention to use and net benefit. So, the supporting factors of Academic information system can be figured out [11][13][18][19] [20].

II. LITERATUR REVIEW

The application of a system in an organization often faces success or failure. Even until now, there are many researchers who conduct research using Delone and McLean design in various objects to determine the achievement of the information system applied. According to [11] in a research towards a system applied in a library, the researcher stated that among three variables related to the quality, service quality had the greatest effect on net benefit experienced by the users, while the quality of the system and information had an effect on users satisfaction, but the system quality did not have effect on the benefits experienced by the users.

In a research conducted by [14] the researcher stated that the quality of information affected user satisfaction, users' intention to use and the organization, while the quality of service affected the users, individual, and the organization. On the other hands, the results of a research conducted by [11] showed that the quality of the system affected the user satisfaction, but it did not affect the users. The quality of information did not significantly affect the users and user satisfaction. The service quality had an influence on the users and also the users satisfaction, and the intention to use the system affected the net benefit and *vice versa*. It is reinforced by Ojo who conducted a research in a hospital in Nigeria, the result of the research indicated that the quality of the system affected the users, while the quality of information and service affected the users and user satisfaction [12].

The researches mentioned above are still related to the title which is being discussed, so that they serve as the reference sources. In addition, the researches also used design framework of Delon and Mclean with research objects from different sectors such as education, health, government, and library [21]. Here are the previous studies that are used as reference sources.

Research	Research Objectives
Edha Tandi Lwoga, 2013. [13]	Testing the application of library technology focused on University of MUHAS, Tanzania
Hanae Rocky & Youssef Al Meriouh ,2015. [14]	This research aims to test the success of a system that has been applied to an automotive industry company using Delone and McLean design by considering eight variables
Po Sheng Chiu et.al ,2016. [11]	Evaluating the application of mobile-based e-book system using Delone and Mclean design and providing recommendations for system development in accordance with the result of the research.
Setyohadi D. B. et.al, 2017 [10]	This research focuses on personnel information system in university in Yogyakarta by investigating the factor which significantly influence elearning and its impact on information, service, and system quality of the information system towards user intent.
Adebowale I. Ojo ,2017. [12]	This research aims to validate Delone and McLean design to assess the success of information system applied to hospitals in developing countries.

III. RESEARCH METHODOLOGY

A. Research Subject

The targets of this research are the main users of academic information system who are active students in Wira Husada School of health science. The questionnaires were given to 280 respondents who are from 3 Study Programs, and then all of the respondents submitted the questioners that they have answered to the researcher. Determination of respondent numbers which are 280 in this research is based on the total population in Wira Husada School of health science which is 933 students.

B. Research Tools

This research consists of several stages. The first stage is observing the field or collecting information and identifying problems found in the academic information system that has been applied. The second step is studying the literature or previous studies that are related to the topic discussed, so that the researcher uses the updated Delon and McLean design

[18]. In addition, the researcher compiles the questionnaires that the answers are in the form of Likert scale consisting of five answers that are, convincingly argue, argue, partially agree, approve, and convincingly approve. These five answers are the opinions of the respondents. Likert scale is used in order to measure the attitudes, opinions and perceptions of a person about the object studied [22].

C. Research Schme

Research flow is the stages or sequences of research done. In this research, the stages are field study, interview, literature study, data collection, determining the design used and making conclusion. Detailed description of the research flow
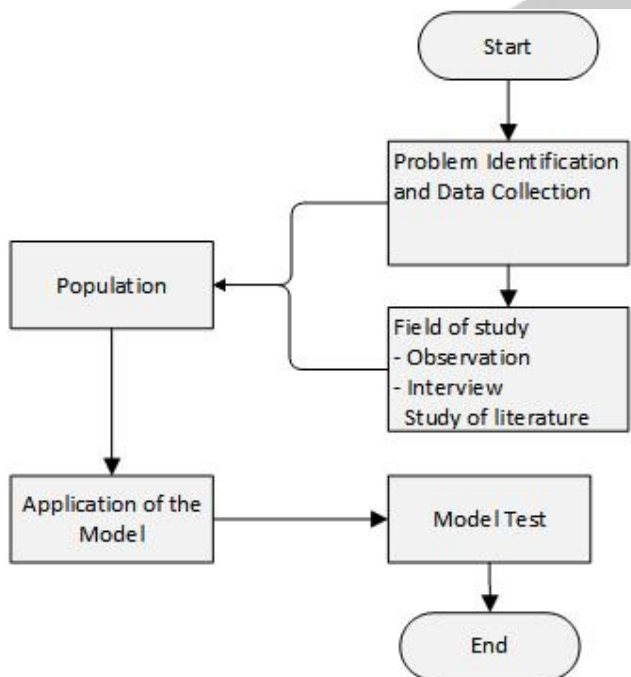
can be seen in Fig 2 below.

Fig. 2. Research flow

D. Research Structure

Based on the research objective, the research structure can be seen in Fig 3. This research focuses on the success of academic information system at Wira Husada School of health science Yogyakarta. The research structure is presented in the picture below.
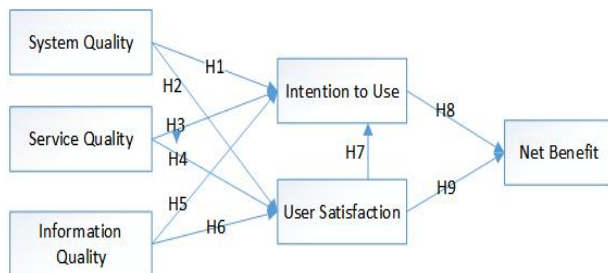
Fig. 3. Research Structure and Hypothesis

E. Research Hypothesis

In this research, the design used is information system success design which was initiated by Delone and McLean in 1992, and then they revised it in 2003. It is used as the basic theory [18][16]. In this research, the targets are six variables which are system quality, service quality, information quality, user intensity, user satisfaction and net benefit. So, in this topic, there are 9 hypotheses that are divided into 2 hypotheses of the system quality, 2 hypotheses of service quality, 2 hypotheses of information quality, 1 hypothesis of user intensity and 2 hypotheses of user satisfaction.

IV. RESULTS AND DISCUSSION

A. Data Analysis

The questionnaires were distributed to 280 respondents from 3 Program Studies, and the technique used to test the relationship among model construction is structural equation modeling (SEM), while the applications used are SPSS version 22 and AMOS version 22 that run on Windows 8 Operation system. The applications have functions to display the flow chart and data analysis of the topic. For the process of analyzing the data, the researcher uses descriptive statistic method with the purpose of describing the data of academic information system user.
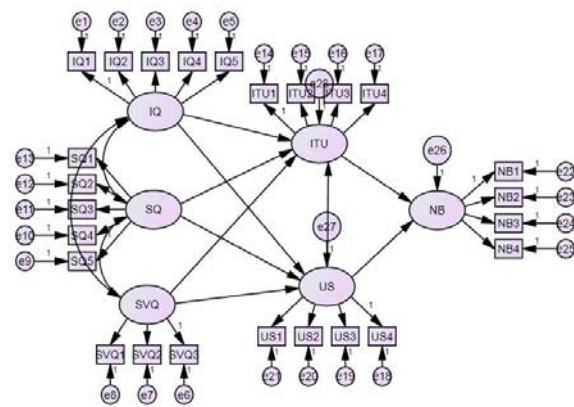
Fig. 4. AMOS diagram Flow

B. Characteristics of Respondents Research

TABLE I. RESPONDENT CHARACTERISTICS

Attribute	Deskripsi	Total	%
Gender	Man	91	32,5
	Women	189	67,5
Age	17 - 22 Years	246	87,9
	23 - 25 Years	34	12,1

Study program	Bachelor of Public Health	81	28,9
	Bachelor of Nursing	138	49,3
	Nursing Diploma	61	21,8

In the respondents' characteristic table, the total number of respondents is 280 students that consist of 189 (67.5%) women and 91 (32.5%) men, and the percentage based on the study programs, the largest number of respondents is 138 (49.3 %) from nursing bachelor program, 81 (28.9%) from Public Health bachelor program, and 61 (21.8%) from Nursing diploma program. Besides, based on age, there are 246 respondents who are 17-22 years old (87.9%) and 34 who are 23-25 years old (12, 1%).

C. Test of Convergent Validity

Measuring the convergence validity requires correlation of several different measurement instruments. CFA (Confirmatory factor analysis) is used to measure or test the validity of the values that exist whether they have a positive effect on this research or not. Based on composition of each composite reliability (CR) value, loading factor value is almost more than 0.7. Therefore, the scale can support well on convergent validity.

TABLE II. REALIABILITY AND AVE CONSTRUC CTED BY OBSERVABLE VARIABLE AND LATEN VARIABLE

	Question	Factor Loading	Component Reliability	AVE
I.Q1	I feel the information generated by Academic Information System is in accordance with the data inputed	0.786	0.8896	0.6180
I.Q2	I think the information available on Academic Information system is presented on time	0.732		
I.Q3	I think the information produced on Academic Information system is precise	0.865		
I.Q4	I think the information generated on Academic Information system is very complete and detailed	0.815		
I.Q5	I feel the information generated by Academic Information system is easy to be understood	0.724		
SVQ1	There is a usage guide of Academic Information system in the system	0.797	0.7897	0.5565
SVQ2	I feel safe when accessing or transmitting data through the System	0.707		
SVQ3	I think Academic Information system gives response in accordance with what I do	0.731		
S.Q1	I think Academic Information system display is easy to be used	0.806	0.8770	0.5881
S.Q2	I think Academic Information system can be accessed anytime and anywhere	0.752		
S.Q3	I feel the confidentiality of the data is guaranteed, because there are different passwords for each user	0.763		
S.Q4	I think Academic Information system uses a language that is easy to be understood	0.714		
S.Q5	I think Academic Information system rarely has an error	0.796		
IT.U1	I often use Academic Information system	0.704	0.8471	0.5820
IT.U2	I am willing to use Academic Information system for Academic purposes	0.759		
IT.U3	I have used all the facilities in Academic Information system	0.726		
IT.U4	I think Academic Information system is very helpful	0.854		
U.S1	I feel the features available on Academic Information system are in accordance with my need	0.851	0.9070	0.7093
U.S2	I am satisfied with the information available on Academic Information	0.864		

	system			
U.S3	I am satisfied using Academic Information system	0.834		
U.S4	I will always use Academic Information system for every need	0.819		
N.B1	By using Academic Information system, users can feel helped	0.714		
N.B2	I think the use of Academic Information system can improve time efficiency	0.853	0.8490	0.5856
N.B3	The use of Academic Information system can facilitate the process of searching Academic Information	0.721		
N.B4	I feel Academic Information system is very useful in the Academic process	0.765		

D. Discriminant Validity

Discriminant validity is a value for stating the degree of validity comparison based on statistical data that exist between one another. A value fulfills the criteria, if the square root value of the average variance extracted (AVE) is higher than the Correlation between Latent Variables [23]. All variables have their own values which are system quality, information quality, service quality, user intensity, user satisfaction and net benefits. For each value, it can be seen in table 3.

TABLE III.   REALIABILITY AND AVE CONSTRUC CTED BY OBSERVABLE VARIABLE AND LATEN VARIABLE

DISCRIMINANT VALIDITY						
	IQ	SVQ	SQ	ITU	US	NB
IQ	**0.7425**	0.1800	0.2140	0.1730	0.2290	0.1660
SVQ	0.1800	**0.7384**	0.1670	0.1630	0.2050	0.1620
SQ	0.2140	0.1670	**0.7130**	0.1760	0.2210	0.1580
ITU	0.1730	0.1630	0.1760	**0.7197**	0.2150	0.1690
US	0.2290	0.2050	0.2210	0.2150	**0.8441**	0.2230
NB	0.1660	0.1620	0.1580	0.1690	0.2230	**0.7099**

E. Structural Analysis Design

In this research, there are six indexes used to measure suitable design wholly. The indexes are root mean square error of approximation (RMSEA), adjust goodness of fit index (AGFI), comparative fit index (CFI), goodness of fit index (GFI) and PCFI. Overall, from table 2, it can be seen that the design shows the results of the suitability levels which are all good [24][25]. Thus, the goodness of fit test result towards the standard design used in this research indicates that the data which are observed are in accordance with the theory or design.

TABLE IV.   FIT ANALYSIS OF RESEARCH MODEL

Goodness of	Cut-off value	Research	Model

fit index		model	
χ^2Chi-Square	Minimized Valued	472,376	Good
RMSEA	Valued	0,053	Good
GFI	≥0.80	0,893	Good
AGFI	≥0.80	0,868	Good
PCFI	≥0,5	0,841	Good
CFI	≥0.90	0,959	Good

F. Test Results of Research Hypothesis

Based on the research that has been done, from 9 hypotheses contained in this research, there are 2 hypotheses rejected and 7 hypotheses accepted. For H1 in this research, it is found that the quality of the information influences the users of the system (p = 0.787, Limit = 005) while for H2, it is found that the quality of the information does not have effect on user satisfaction (p = 0,002, Limit = 0, 05). For H3, it is found that system quality has an effect on users (p = 0,087, Limit = 0,05) but for H4, system quality does not affect users satisfaction (p = 0,036, Limit = 0,05). For H5 and H6 in this research, it is found that service quality has an effect on users (p = 0,015, Limit = 0,05) and users satisfaction (p = 0,000, Limit = 0,05). For H7 and H8 in this study, it is found that users satisfaction has an effect on users (p = 0.001, Limit = 0.05) and also net benefits (p = 0,000, Limit = 0.05). For H9 in this research, it is found that users satisfaction affects net benefits (p = 0,000, Limit = 0.05).

No	Hypotheses	P	Limit	Results
1	Information quality affects the user	0,475	0,05	Not supported
2	Information quality affects the user's satisfaction	0,008	0,05	Supported
3	System quality	0,090	0,05	Not

	affects the user			supported
4	System quality affects the user's satisfaction	0,003	0,05	Supported
5	Service quality affects the user	0,000	0,05	Supported
6	System quality affects the user's satisfaction	0,000	0,05	Supported
7	User's satisfaction affects the user	0,000	0,05	Supported
8	User affects the benefit	0,000	0,05	Supported
9	User's satisfaction affects the benefit	0,000	0,05	Supported

V. CONCLUSIONS

According to the analysis result, it can be inferred that from 9 hypotheses, 7 hypotheses have positive impact and 2 hypotheses do not have positive impact, the quality of information affects user satisfaction but it does not affect user intensity, system quality affects user satisfaction but it does not affect user intensity. It can be concluded that user does not really feel the quality of the system and information because the user assumes that the system has not been applied optimally, quality service affects the intensity of users and user satisfaction, the intensity of users affects the net benefit, and user satisfaction affects the intensity of the user and net benefit. Based on the conclusions, the researcher suggests the college to consistently make the academic information system that has been applied to be the only one medium to share various information related to the academic world. The researcher suggests the college operator to realize the importance of the academic information system in supporting the performance process of the college. Therefore, the researcher suggests Wira Husada school of health science Yogyakarta to always give announcement and counseling to all students to use all academic information system facilities maximally.

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