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# 3 THE EFFECTIVENESS OF INFORMATION SYSTEM E-PROSATA IN AN EDUCATIONAL INSTITUTION

D. Surya

37  
Management and Information System, Bina Nusantara University, Jakarta, Indonesia

18  
F. L. Gaol

Doctor of Computer Science, Bina Nusantara University, Jakarta, Indonesia

## ABSTRACT

*E-PROSATA is one of the information systems developed and implemented in an educational institution in Indonesia. Although recently used, this information system needs to be evaluated to find out the benefits provided to users and what factors contribute to user ratings. This study aims to assess the effectiveness of E-PROSATA using Updated Information System Success Model DeLone & McLean. With as many as 100 respondents and using the PLS-SEM method, the results showed that users are satisfied with the performance of E-PROSATA and the users also state that E-PROSATA has successfully overcome the problems encountered when using the previous information system. This study also found that 'System Quality' and 'Information Quality' have a significant influence on 'User Satisfaction', while 'Service Quality' has no significant effect on 'User Satisfaction'. Variable 'User Satisfaction' also has a positive and significant effect on the variable 'Net Benefits'.*

**Keywords:** Effectiveness of information system, Information system success model, User satisfaction, System quality, Technology management valuation.

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## 1. INTRODUCTION

E-PROSATA is an information system used by one of the educational institutions in Indonesia to compile and evaluate annual programs and their budgets from each department in the organization. The information system was created to replace the old information system and was used since a year ago. The organization hopes that E-PROSATA can overcome the problems faced by users when using the previous information system.

An information system developed in an organization as an effort to improve the effectiveness and efficiency of the organization. Many studies have been conducted on the

impact of the use of information systems such as improving organizational performance, adding value to strategic matters and optimizing business processes [1-4] Nevertheless, these studies are generally limited to manufacturing organizations that are profit-seeking [5]. Conversely, similar studies for non-profit organizations, especially in education sector, are still very limited. Also in non-profit organizations, performance appraisal is often not based on economic benefits, but performance is often measured based on qualitative targets [6].

To develop an information system that has an impact on organizational performance is usually required a large investment and this makes the information system under the supervision and pressure to be able to contribute to productivity, quality and competitiveness of the organization [7]. Certainly the organization wants to know the return of this investment, but often the impact is not seen directly and is influenced by human, organizational and environmental factors, therefore the measurement of the success of information systems is complex and not easy [8]. Also, the effectiveness of E-PROSATA as a new information system is very important to do, so that its intangible effectiveness can be measured and proven.

## 2. LITERATURE REVIEW

### 2.1. Success factors

How do we know that a project (including an information technology project) is successful? Two factors that can be measured are if the project reaches its main goal and satisfies its users [9]. Every information technology project must have a goal that must be achieved, for example a new information system is created to overcome the problems that exist when using the previous information system. This means that the new information system must effectively solve the problem. When the problem can be resolved, it is expected that the new information system user can feel satisfied, which means the project is declared successful. Conversely, when the user likes the new information system, the new information system will automatically be declared successful [10].

### 2.2. Selecting Measurement Model

To measure the success of an information system project, we need a measurement model. The measurement model must be valid and in accordance with the needs and characteristics of the information system to be measured. There are various types of measurement models from previous studies and these models evolve and are updated from time to time.

Selecting a measurement model that suits the needs and characteristics of the information system to be measured is determined by several things, namely the objectives of the study, the variables measured and the nature of the use of the measured information system whether mandatory or voluntary.

#### 2.2.1. Objectives of the Study

Based on the literature review there are studies that measure the successful implementation of an information system from how users receive and respond to the information system [11-17]. But there are studies that measure the quality of information systems, assess their impact on users or organizations and ultimately determine the effectiveness of the information system [18-20].

### 2.2.2. Variables

In previous studies, measurement usually refers to a main model, but researchers add and reduce constructs on the model, with the intention that the measurement model used is truly in accordance with the research needs [18] [20-22].

### 2.2.3. Mandatory or Voluntary

Looking at reality, the decision to use an information system in an organization cannot be decided by the user. Users cannot choose whether they are willing to use the available information system or not [23]. Some measurement models attempt to accommodate the mandatory use of information systems by adding 'voluntariness' as a control variable as in the TAM 2 model [24], TAM 3 [25], and UTAUT [26]. But such a model can only provide a partial explanation of whether the use of the information system by its users in the organization is on a voluntary basis or because of an obligation [27]. The same is highlighted in the IS Success Model [28]. Even DeLone & McLean himself suggested that the 'use' variable was only relevant if such use was not mandatory. If the use of the system is mandatory, the 'intention to use' only conveys little information. So in a mandatory state, the constructs of 'intention to use' and 'use' are removed from the model [7].

## 3. METHODOLOGY

### 3.1. Study Framework

This study will adopt the Updated Information System Success Model (Updated IS-Success Model) [29], as shown in Figure 1. The Updated IS-Success Model was chosen because the purpose of this study not only measures user acceptance and response, but measures the effectiveness of E-PROSATA in answering problems faced by users when using the previous information system. The second reason is because the variables measured in Updated IS-Success Model are in accordance with the needs of this study. But there was one variable that was dropped, namely the 'intention to use / use' variable because the use of E-PROSATA in the organization is mandatory and without E-PROSATA business processes in the organization cannot run. So this study will use the model shown in Figure 2 and this model is also used in one of the studies in Malaysia [20]. In this study framework there are three variables that will determine user satisfaction, namely the 'Quality System', 'Information Quality' and 'Service Quality'. Thus 'User Satisfaction' acts as a mediating variable to observe the global impact on 'Net Benefits'.

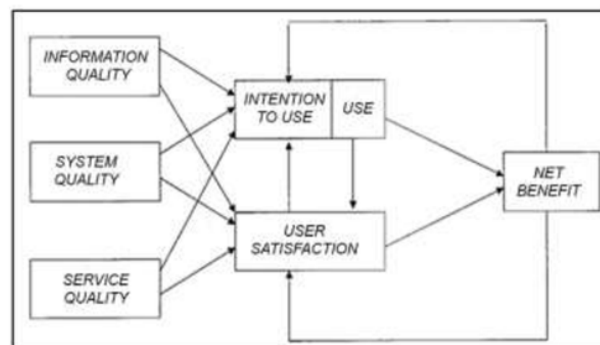


Figure 1 Updated IS-Success Model





Figure 2 The Study Framework

### 3.2. Hypotheses

As previously explained, the success factors of an information technology project can be measured from two things, namely the achievement of goals and user satisfaction. Based on this, the following hypotheses are proposed:

H 1 - 1: Users agree or strongly agree that E-PROSATA has successfully overcome the problems faced when using the previous information system

H 1 - 2: Users agree or strongly agree that they are satisfied with the E-PROSATA performance

In addition, using IS-Success Updated Model can also be measured which variables have a significant effect on other variables. Based on this, the following hypotheses are proposed:

H 2 - 1: System Quality is significantly relate to User Satisfaction

H 2 - 2: Information Quality is significantly relate to User Satisfaction

H 2 - 3: Service Quality is significantly relate to User Satisfaction

H 2 - 4: User Satisfaction is a significant mediator

### 3.3. Questionnaire

This questionnaire (Table 1) was developed based on previous studies, except for the 'Net Benefits' variable. Indicators for 'Net Benefits' are developed based on the problems faced by users when using the previous information system. Assuming that if these problems are not experienced by the user when using E-PROSATA then that is the Net Benefits received by the user. Based on the initial assessment before E-PROSATA was developed, there were five problems faced by users and the main objective of implementing E-PROSATA is that these five problems can be resolved. Measurement of each indicator was done using a five-Point Likert-type scale. Point 1 means 'Strongly Disagree', point 2 means 'Disagree', point 3 means 'Neutral', point 4 means 'Agree' and point 5 means 'Strongly Agree'.

Table 1 Variables and Indicators

Variables	Indicators	References
System Quality	SyQ1- Availability	[30]; [31]; [32]; [33]; [34]
	SyQ2 - High-speed access (response time)	[30]; [31]; [33]; [34]
	SyQ3 - Security and privacy	[31]
Information Quality	IQ1 - Completeness	[30]; [31]; [32]; [33]; [34]
	IQ2 - Relevance	[30]; [32]; [33]
	IQ3 - Up to date (timeliness)	[30]; [32]; [33]; [34]
	IQ4 - Understandability	[30]; [33]
	IQ5 - Accurate	[32]; [34]
Service Quality	SeQ1 - Provide what has promised	[34]
	SeQ2 - Adapts to the user needs	[34]

Variables	Indicators	References
	SeQ3 – Follow up service	[34]
User Satisfaction	US 1- Satisfied because meet information needs	[32]
	US 2 – Satisfied because very helpful	[33]
	US 3 – Satisfied with the performance	[34]
	US 4 – Overall	[30]; [32]; [33]
Net Benefits	NB 1 – E-PROSATA gives a warning if I do not complete the work program and complete evaluation	Initial Assessment in the organization (problem 1)
	NB 2 – E-PROSATA is the only data source for me, when I want to get an agreed work program	Initial Assessment in the organization (problem 2)
	NB 3 – E-PROSATA helps me to compile work program costs so as not to exceed the specified limit	Initial Assessment in the organization (problem 3)
	NB 4 – E-PROSATA makes it easy for me to make work program evaluations every semester	Initial Assessment in the organization (problem 4)
	NB 5 – E-PROSATA makes it easy for me to monitor the achievement of my department's performance	Initial Assessment in the organization (problem 5)

### 3.4. Data collection

The population of E-Prosata users at the time the questionnaire was distributed was 139 people, so the number of samples needed for the 5% error rate was 100 respondents [35]. The sampling technique used is Simple Random Sampling. One hundred and six questionnaires were returned and there were 6 questionnaires that were not filled in completely so that only 100 questionnaires were analyzed. Data analysis was performed using SmartPLS for both validity / reliability and hypotheses testing.

### 3.5. Validity and Reliability

By using SmartPLS, it has been tested for validity and reliability, by measuring three things, namely Cronbach's Alpha, Composite Reliability and Average Variance Extracted (AVE), with Cronbach's Alpha requirements > 0.7, Composite Reliability > 0.6 and AVE > 0.5 [36]. With the results as shown in Table 2, it can be concluded that all the results meet the requirements.

**Table 2** Validity and Reliability Results

Variable	Cronbach's Alpha	Composite Reliability	AVE
SyQ	0,707	0,835	0,630
IQ	0,822	0,875	0,584
SeQ	0,758	0,861	0,674
US	0,950	0,964	0,869
NB	0,888	0,919	0,695

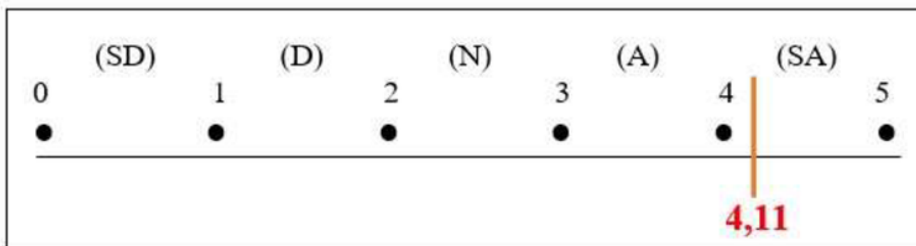
## 4. RESULT

For two hypotheses, H 1 - 1 and H 1 - 2, the Mean of the 'User Satisfaction' and 'Net Benefits' variables will be calculated. Then the Mean results can be determined in the area of 'Strongly Disagree (SD)', 'Disagree (D)', 'Neutral (N)', 'Agree (A)' or 'Strongly Agree (SA)' [35]. The results of data analysis for 'User Satisfaction' and 'Net Benefits' are shown in Table 3.

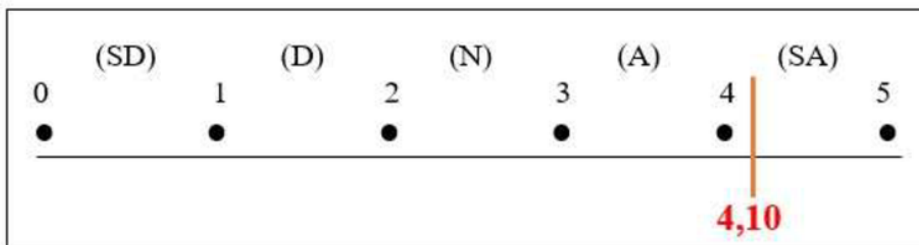
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**Table 3** 'User Satisfaction' and 'Net Benefits' Analysis

User Satisfaction			Net Benefits		
Indicators	Mean	Ideal Score	Indicators	Mean	Ideal Score
US 1	4,11	5	NB 1	4,09	5
US 2	4,14	5	NB 2	3,93	5
US 3	4,10	5	NB 3	4,33	5
US 4	4,08	5	NB 4	4,07	5
			NB 5	4,08	5
Average	4,11	5	Average	4,10	5

With the results shown in Table 3, 'User Satisfaction' and 'Net Benefits' are in the 'Strongly Agree (SA)' area, shown in Figure 3 and Figure 4 respectively. Thus it can be stated that users strongly agree that E-PROSATA has successfully overcome the problems faced when using the previous information system and users strongly agree that they are satisfied with the performance of E-PROSATA.



**Figure 3** 'User Satisfaction' result area



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**Figure 4** 'Net Benefits' result area

For the other four hypotheses, H 2 - 1, H 2 - 2, H 2 - 3, and H 2 - 4, will be calculated using Structural Equation Model (SEM). The results are shown in Table 4. The outcomes show that all relationships between variables are positive. With a significant level of 5% (0.05), if compared with the results in column p values, only the relationship between 'Service Quality' and 'User Satisfaction' is not significant (p value 0.452 > 0.05). While other relations can be declared as significant, because it has a p value lower than 0.05.

**Table 4** Regression Analysis Results

Path	Mean	SD	T	p Values
SyQ → US	0,259	0,103	2,449	0,015
IQ → US	0,433	0,087	4,568	0,000
SeQ → US	0,109	0,141	0,752	0,452
US → NB	0,785	0,078	10,287	0,000

## 5. CONCLUSION

This paper presents a study on the effectiveness of an information system called E-PROSATA which is used in one of the educational institutions in Indonesia to compile a work plan and budget from each department in the organization. The findings of this study are that users are satisfied with the performance of E-PROSATA and the users also state that E-PROSATA has successfully overcome the problems encountered when using the previous information system.

Using SEM calculations, this study also found that 'System Quality' and 'Information Quality' have a significant influence on 'User Satisfaction', while 'Service Quality' has no significant effect on 'User Satisfaction'. Of the three variables that have been measured, 'Information Quality' has the strongest effect on 'User Satisfaction'. Variable 'User Satisfaction' also has a positive and significant effect on the variable 'Net Benefits'.

To conclude, this study may provide new insights and information for all information system implementers, that the success of an information system is not only measured economically but its effectiveness can also be measured in the manner as applied in this study.

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