Online Public Access Catalogue: Factors Affecting Use E-Catalog

Farida Ardiani

Department of Informatics, Technology University of Yogyakarta, Yogyakarta, Indoensia
ardianifarida@gmail.com

Abstract— **Online Public Access Catalog (OPAC) is one of the e-catalog information technologies applied in libraries. OPAC is a library information retrieval system that can be accessed online. State Islamic University of Sunan Kalijaga Yogyakarta has been using OPAC since 2012 and OPAC users are increasing from year to year. An information system will be used by users if it suits their needs. The successful implementation of OPAC raises questions about the factors that influence this success. For this reason, this study aims to determine the factors that influence users to use OPAC. Structural Equation Modeling (SEM) is a multivariate statistical technique which is a combination of factor analysis and regression analysis (correlation) which aims to examine the relationships between variables in a model. Processing using SEM will be carried out to find the relationship between the variables to be tested, which variables are interconnected, and are there any unrelated variables. The results of processing the variables using SEM can show what variables attract users to use the e-catalog. Acceptance of information systems can be measured by several evaluation models that have been developed at this time. There are many evaluation models used to measure. Technology Acceptance Model (TAM) is the appropriate model to use for this study, because this study is about the acceptance of a system. In addition, several previous studies used by researchers as references also used TAM as their study method to assess user acceptance of a system. This study modifies TAM, which is used to determine user acceptance of an information system, by adding three exogenous variables, information quality, perceived enjoyment, and user interface. Results of this study proved that information quality, user interface, perceived usefulness, perceived ease of use, and behavioral intention to use, are all factors that influence the actual use of OPAC. Perceived enjoyment is a variable that cannot be proved affects the actual use of OPAC.**

Keywords— Information Quality, Online Public Access Catalogue, Perceived Enjoyment, User Interface

1 INTRODUCTION

Among the various of developing technologies, information technology is one of the technologies that is developing rapidly. Impact of the inventions in technology has led humans to be better civilization. Traditional behaviors are starting to be abandoned and replaced by more modern ones that utilize technology. However, a lack of user acceptance has long been a barrier to the success of new information systems [1]. Much study has been done to study individual reactions to technology users.

Information technology has changed a process from a traditional system to a modern system which also has an impact on changing the function of libraries [2]. Online Public Access Catalog (OPAC), according to Mahmood [3], is defined as a computerized system for providing catalogs and organizing library materials. It is a retrieval system that provides multiple ways to search for library materials [4]. It makes entire process online where student can search books, staff can generate reports and do book transactions [5]. The academic library's main task is to select, maintain, and provide access to potential and quality information resources [6]. One of the characteristics of OPAC is information updates are carried out in the short term [7]. This aims to ensure the quality of the information, especially with regard to the compatibility between the information on the OPAC and on the shelf in library. Academic libraries should evolve ways to overcome obstacles in order to establish successful digitization efforts [8].

The Library of the State Islamic University of Sunan Kalijaga Yogyakarta is one of the libraries that uses OPAC as one of its information systems. Users of OPAC are increasing from year to year. In order for OPAC to improve its services, it is necessary to assess the factors that influence the use of OPAC. It has been done to get proposals for the development and improvement of services that are more in line with the wishes of the user so that it affects the use of OPAC, because an information system will be used by users if it suits their needs [9]. Better understanding users' reasons for accessing a system allows for a more robust evaluation of how well that system performs [10]. In addition, OPAC development can help library users and professionals to find and access library resources easily without wasting energy and time [11].

2 METHOD

This study uses Technology Acceptance Model (TAM) to see the factors that affect user acceptance of OPAC. TAM is the theory most commonly used by researchers to explore user acceptance [12]. TAM stated that behavioral intension to use information system are determined by two beliefs: perceived usefulness and perceived ease of use. Perceived usefulness is the degree to which people believe that the use of the system will increase his performance. Perceived ease of use is the degree to which people are confident that this system is easy to use. Bouwman [13] and Punnoose [14] used TAM by adding the perceived enjoyment variable, to get the results of acceptance of the e-learning information system. Information quality is an important point that must be fulfilled in supporting the benefits that must be achieved. If the information quality of the knowledge management system

is good, then the resulting knowledge output is also correct. Thus, users will believe that the system can provide correct information [15]. This study also adds a variable quality of information as a factor to measure user acceptance of information systems. OPAC is the first information system in library history that makes users reliable with catalogs [16]. Thus, the user interface must be made as easy as possible for the user, so that the user does not have difficulty learning or depending. Carey [17] states that, the user interface should be designed as if each user is the first time user and the user interface should provide as many cues as possible. The third variable added in this study is the user interface.

Finda [18] has the same study about OPAC. The purpose of her study was to determine the level of satisfaction of OPAC users using the EUCS method. This method emphasizes satisfaction with content value, accuracy, format, user convenience, and timeliness. The conclusion of her study, the user is satisfied with the implementation of the OPAC system in the UNRI Library. Yanuar [19] by using the same method – TAM, based on DeLone and McLean method. His study aims to describe the system acceptance of OPAC contained in the Library of the University of Airlangga which refers to information systems success model D&M. The result of his study shows that quality of the system, quality of information and quality of service has a good level of satisfaction to increase user satisfaction. They study aims to find how satisfied the users of OPAC, but this study is to find out, what factors that affecting the use of OPAC.

Structural Equation Modeling (SEM) is used to process variables. The SEM model is generally divided into two main parts, namely the measurement model and the structural model. Measurement model is part of the SEM model which consists of a variable and several indicators that explain these variables. In other words, a measurement model describes the relationship between variables and their indicators. Measurement model test is done to find out how precisely these indicators can explain the existing variables.

Structural model is a model of causal relationship between variables. Structural models have the same components as measurement models, which have several indicator variables that explain these variables. However, the measurement model test treats all variables as exogenous variables. Meanwhile, the structural model test divides the variables into two parts, namely exogenous and endogenous variables, in other words the structural model describes the causal relationship between exogenous and endogenous variables.

The explanation of the stages carried out in the SEM analysis process is as follows:

1. Causality Relationship Path Diagram
2. Data Normality
3. Evaluation of Outlier data
4. Reliability Test
5. Measurement Model Test
6. Modification of the Model
7. Structural Model Test

3 RESULT AND DISCUSSION
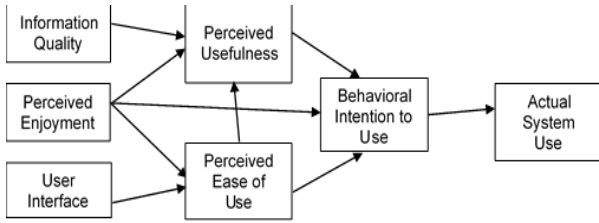
3.1 *Causality Relationship Path Diagram*
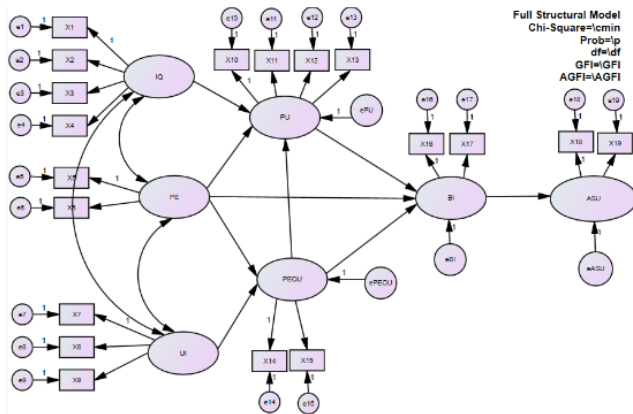

Figure 1. Study Model

Figure 2. Study Model with Indicators

This study used 19 indicators to test these variables, which are written with the symbols X1 to X19.

Table 1. Indicators of Variables

Indicator	Symbol
Information Quality	
Completeness	X1
Accuracy	X2
Relevance	X3
Format	X4
Perceived Enjoyment	
Enjoyment	X5
Happiness	X6
User Interface	
Match between system and the real world	X7
Aesthetic and minimalist design	X8
Consistency	X9
Perceived Usefulness	
Work More Quickly	X10
Increase Productivity	X11
Makes Job Easier	X12
Useful	X13
Perceived Ease of Use	
Easy to Learn	X14
Clear & Understandable	X15
Behavioral Intention to Use	
Pleased to use system in the future	X16
Intend to increase my use of the system in the future.	X17
Actual System Use	
Using the system regularly	X18
Using the system whenever need book information	X19

The population in this study were students of State Islamic University of Sunan Kalijaga Yogyakarta who used OPAC at State Islamic University of Sunan Kalijaga Yogyakarta. Total data that used in this study were 400 data.

Probability sampling technique (simple random sampling) used because the differences in level that may exist in each element of the population are not important and have not an influence on the results of the study. Thus, every element of the population has the same opportunity to be selected as a respondent.

3.2 *Data Normality*

The evaluation of the results shown in Table 2 shows that all values of c.r kurtosis and c.r skew fulfill the requirements below ± 2.58, except for variable X4 the value of c.r kurtosis, 4.256. However, this value can be ignored because the c.r skew value is below ± 2.58, which is -4.529. Then the results of the multivariate c.r value also show a number below ± 2.58. Based on these results it can be concluded that, the data is normally distributed both individually and multivariate.

Table 2. Assessment Normality

Assessment of normality (Group number 1)

Variable	min	max	skew	c.r.	kurtosis	c.r.
X9	.693	1.609	.331	.854	-.451	-.582
X8	.693	1.609	-.909	-2.346	.709	.915
X19	1.099	1.609	-.244	-.630	-.835	-1.078
X18	.693	1.609	-.965	-2.491	1.139	1.470
X17	1.099	1.609	-.565	-1.459	-.716	-.924
X16	1.099	1.609	-.584	-1.508	-.253	-.327
X15	.693	1.609	-1.237	-3.195	1.682	2.172
X14	1.099	1.609	-.584	-1.508	-.253	-.327
X13	1.099	1.609	-.161	-.416	-.142	-.184
X12	.693	1.609	-.613	-1.583	.526	.678
X11	1.099	1.609	-.735	-1.897	-.083	-.107
X10	.693	1.609	.272	.703	.232	.299
X6	.693	1.609	-1.012	-2.612	.729	.941
X5	1.099	1.609	-.565	-1.459	-.716	-.924
X4	.693	1.609	-1.754	-4.529	3.297	4.256
X3	.693	1.609	-.503	-1.298	.060	.077
X2	.693	1.609	-1.014	-2.619	-.016	-.020
X1	.693	1.609	-1.012	-2.613	.995	1.285
X7	.693	1.609	-.975	-2.518	.455	.587
Multivariate					22.844	2.557

3.3 *Evaluation of Outlier data*

Outlier evaluation is done by looking at the value of the mahalanobis distance must be smaller than the value of X^2 0.005 (20), which is 39.997. If there is data that does not fulfill these requirements, the data is discarded from the analysis. In this study, based on the results of the outlier evaluation output, there is no data with the mahalanobis distance value above 39.997. Therefore, it can be concluded that there are no outliers in this study data.

3.4 Reliability Test

In the SEM method, measuring the reliability of an indicator on the variable can be done with two calculations, namely construct reliability (1) and variance extracted (2):

$$Construct\ Reliability = \frac{(\sum Standard\ Loading\ )^2}{(\sum Standard\ Loading\ )^2 + \sum E_i} \qquad (1)$$

The acceptable construct reliability value is ≥ 0.70.

$$Varience\ Extracted = \frac{\sum Standard\ Loading\ ^2}{\sum Standard\ Loading\ ^2 + \sum E_j} \qquad (2)$$

The acceptable extracted variance value is ≥ 0.50.

Standard loading is obtained from standardized loading for each indicator obtained from the results of computer calculations. $\sum E_j$ is the measurement error of each indicator. Measurement error can be obtained from 1-reliability indicators.

The results of the construct reliability and variance extracted from this study are shown in Table 3 and Table 4.

Table 3. Construct Reliability

Variable	Construct Reliability Value	Result
IQ	0,899	Good
PE	0,801	Good
UI	0,632	Enough
PU	0,953	Good
PEOU	0,905	Good
BI	0,882	Good
ASU	0,782	Good

Table 4. Variance Extracted

Variable	Variance Extracted Value	Result
IQ	0,774	Good
PE	0,576	Enough
UI	0,495	Enough
PU	0,711	Good
PEOU	0,834	Good
BI	0,704	Good
ASU	0,772	Good

3.5 Measurement Model Test

The requirements that must be fulfilled in the confirmatory test for exogenous and endogenous variables, is an indicator must be convergent with a loading factor value above 0.5.

Table 5. Convergent Validity Exogenous Variables

Standardized Regression Weights: (Group number 1 - Default model)

		Estimate
X7 <---	UI	.875
X1 <---	IQ	.641
X2 <---	IQ	.629
X3 <---	IQ	.522
X4 <---	IQ	.891
X5 <---	PE	.601
X6 <---	PE	.955
X8 <---	UI	.634
X9 <---	UI	.411

The results of the convergent validity estimation of the exogenous variables in Table 5 show that there is one indicator with an estimated value of less than 0.5, X9. This means that, X9 is not convergent at one point, so X9 must be removed from the model because it is not valid to measure the variable.

Table 6. Convergent Validity Endogenous Variables

Standardized Regression Weights: (Group number 1 - Default model)

		Estimate
X10 <---	PU	.503
X12 <---	PU	.784
X15 <---	PEOU	.715
X11 <---	PU	.742
X14 <---	PEOU	.534
X13 <---	PU	.677
X17 <---	BI	.634
X16 <---	BI	.782
X18 <---	ASU	.667
X19 <---	ASU	.707

The results of the convergent validity estimation of endogenous variables in Table 6 show that all indicators have convergent at one point, valid in measuring the variables.

After conducting a confirmatory analysis for each exogenous and endogenous variable, a full model estimation should be assessed with re-combining of all exogenous and endogenous variables with all indicators that passed the confirmatory test. The estimation process uses the MLE technique with three goodness of fit criteria; absolute fit measures, incremental fit measures and parsimonius fit measures. The full model estimates are shown in Table 7.

Table 7. Goodness of Fit Full Model (after passing the confirmatory test)

Measures Index	Cut Off Value	Model N=400
Absolut Fit Measures		
CMIN	< 2 (conditionally depending on the number of data samples)	113,039
GFI	> 0,9	0,882
RMR	Smaller is better	0,009
RMSEA	<= 0,08	0,081
Incremental Fit Measures		
AGFI	> 0,9	0,932
TLI	> 0,9	0,901

NFI	> 0,9	0,982
Parsimonius Fit Measures		
PNFI	> 0,5	0,533
PGFI	> 0,5	0,632

The results of the goodness of fit full model proved that all the measures index has reached the cut off value, thus, this structural equation model has met the criteria for the fit model. So it does not require a model modification stage.

3.6 Structural Model Test

The structural model test was carried out to see the respective coefficient values for the relationship parameters between variables. The value of the C.R. parameter coefficient of each relationship between variables is compared with the critical value of 1.96 at the significance level of P. The relationship between variables and the parameter coefficient of C.R. > 1.96 indicates that the variable has a positive effect on other variables. Conversely, if the variable is <1.96, the variable has no positive influence on other variables. The direction of the influence of a variable on other variables can be seen from the arrows shown in each relationship between variables. The level of significance of the relationship between variables can be seen from the P value of each interconnected variable. If the P value is a three star (***) then the relationship between these variables is significant at the 0.001 level. If the P value is a number below 0.05, the relationship between these variables is significant at the 0.05 or (5%) level. If the P value is above 0.05, it can be ascertained that the C.R. value is <1.96. This means that the variable does not have a positive influence on other variables. The results of parameter coefficients can be seen in Table 8.

Table 8. Structural Model Test

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
PEOU	<---	PE	-.119	.311	-.383	.702	par_3
PEOU	<---	UI	.380	.064	5.893	***	par_4
PU	<---	IQ	.154	.067	2.286	.022	par_1
PU	<---	PE	-.093	.116	-.808	.419	par_2
PU	<---	PEOU	.404	.129	3.137	.002	par_7
BI	<---	PEOU	1.781	.413	4.310	***	par_5
BI	<---	PE	.839	.438	1.914	.056	par_6
BI	<---	PU	-1.532	.826	-1.855	.064	par_21
ASU	<---	BI	.745	.084	8.865	***	par_23

Based on the results of the output parameter coefficient of the relationship between variables in Table 8, it can be proved that all variables have a positive effect on other variables according to the previously created model, except for the PE variable which does not have a positive effect on the PEOU variable and PU variable, with C.R. -.383 and -.808, and the PU variable has no positive effect on the BI variable with a C.R. value of -1.855.

4 CONCLUSION

This study shows that information quality, user interface, perceived usefulness, perceived ease of use, and behavioral intention to use are all factors that influence the use of OPAC.

Perceived enjoyment cannot be proved as a factor affecting perceived ease of use, because the C.R. value does not exceed 1.96. Some study used the perceived enjoyment variable based on the TAM model, but on different information system, shows that perceived enjoyment affected perceived usefulness and perceived ease of use.

Bouwman [13] was conducted to explain the factors that influence the intention to use and that underlie the actual use of the Location-Based Social Network (LBSN) information system. The results of this study indicate that perceived enjoyment has a positive effect on perceived usefulness, perceived ease of use and behavioral. In addition, study by Cheema [20] on his study the impact of enjoyment in TAM related to 21st century online sales trends. This study was conducted to create a model based on TAM to determine the factors that influence the intention to use online sales. The results of this study also proved that perceived enjoyment has a positive effect on behavioral intention to use. Similar study results were also evidenced by Saadé [21] the study related to the influence of motivation on intention to use Web-based Learning System (WLS) or online learning media in Canada and China. The results proved that perceived usefulness and perceived enjoyment have a significant effect on students' intentions in using online learning media in both countries.

However, this does not mean that perceived enjoyment will always have no positive relationship to perceived usefulness and perceived ease of use on OPAC. This could be due to a studyer error in providing the indicators used to determine the perceived enjoyment variable or this kind of system (searching system) doesn't need enjoyable to use it.

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