

Determinants of Actual Digital Library Usage

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Abstract—The purpose of this research was to determine the influence of perceived usefulness, perceived ease of use and attitude toward using digital libraries. Data analyzed by structural equation modeling (SEM) with partial least square (PLS) to explain the actual digital libraries usage among university student. The analysis includes the results of measurement model and structural model. Based on sample of 400 user of university digital library, the results of the research indicate that: 1) perceived ease of use has significant and positive effect on the perceived usefulness of digital libraries. Its mean users will find digital libraries are useful since it become easier to use, 2) perceived ease of use have significant and positive effect on the attitude toward using digital libraries. This finding confirm that acceptance of digital libraries depends on friendliness of that system, 3) perceived usefulness significantly influence the attitude toward using digital libraries, and 4) attitude toward using digital libraries have significant and positive effect on the actual digital libraries usage. Users may be willing to accept the digital libraries and continue to use in the future if they found the usefulness of that system.

Keywords—actual system use; perceived ease of use; perceived usefulness; attitude toward using

I. INTRODUCTION

Needs to high information makes students expect a media that can provide information quickly and facilitate every student to conducts academic activities and learning process. A number of technological applications have been applied in education such as digital library. Digital library has provided a comprehensive information access for users, especially students and freeing users from dependence on space and time. Borgman said a digital library refer to electronic collection and conveys a sense of richer content and fuller capacities than do terms such as database or information retrieval system [1].

According to Borgman, information access in digital library context has three essential elements, namely connectivity, content and services, and usefulness or usability [2]. Connectivity is a prerequisite for a computer network along with the resources and support services that can be used. Content and services associated with everything provided and executed in the information infrastructure. Usability concept consists of three aspects; firstly, the use of a computer network or the infrastructure itself. Secondly, a set of skills or user literacy on the system. The third, content can be used, meaning that the information obtained should be opened to be read [2].

A number of previous studies show that despite all efforts have been deployed by higher education institutions to increase the use of digital libraries in order to provide better access and easier toward information, many students have not harness it. At the end, digital library remains underutilized [3]. The phenomena are also founded in Universitas Negeri Padang. Although digital libraries have been provided since a few years ago, there are still many students who use manual methods in searching the literature. To increase the use of digital library optimally, it is necessary to understand user acceptance toward digital library. Therefore, this research trying to find what factors can influence digital libraries usage. By explaining behavior of digital library usage from user perspective, it is expected will help university authorities to build a better digital library which can acceptance by users.

According to Davis, actual system use reflects the real conditions of system usage, conceptualized in the form of measurements of the frequency and duration of technological usage [4]. Davis also argues that lack of user acceptance has impendent to the success of information system [5]. Technology acceptance model (TAM) is an established model in explaining information technology acceptance behavior [6]. TAM was developed by Davis included two constructs: perceived usefulness which is defined as the degree to which a person believes that using a particular system would enhance his or her job performance and perceived ease of use which is defined as the degree to which a person believes that using a particular system would be free of effort [7]. According to TAM, behavioral intention is jointly determined by perceived usefulness altogether with perceived ease of use explains attitudes.

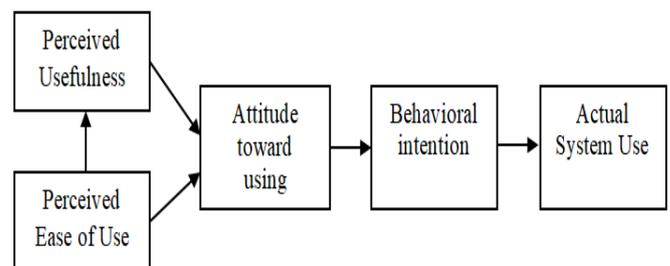


Fig. 1. Technology acceptance model.

Attitude in TAM is defined as form of acceptance or rejection as an impact when a person uses a technology in his

work. Further explained that attitude factor is one aspect that influences individual behavior. The attitude of a person consists of cognitive elements, affective and components related to behavior. Attitudes toward an object play an important role in influencing their subsequent behavior toward it and there is evidence that user attitudes are positively related to computer usage. Someone will use a system if they believe that the system is easy to use and will increase their productivity, which is reflected in actual use. TAM is a model widely used in explaining the behavior of adoption of information system. One key benefit of using TAM is to understand system usage behavior that provide a framework to investigate the effect of construct belief on system usage. Venkatesh suggest the use of information technology which is based on the user's own desire is one condition that restrict the use of TAM. Using digital library can be classified into category of voluntary system because student can choose whether use it or not [8].

Based on the previous studies, hypotheses for this research are:

H1: Perceived ease of use will have a positive effect on perceived usefulness of digital library.

H2: Perceived ease of use will have a positive effect on students' attitude toward using digital library.

H3: Perceived usefulness will have a positive effect on students' attitude toward using digital library.

H4: Attitude toward using digital library will have a positive effect on actual digital library use.

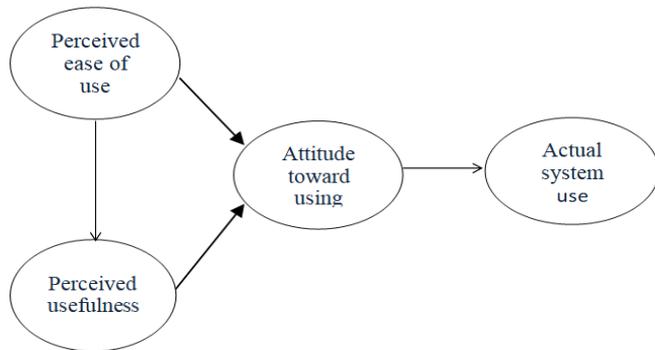


Fig. 2. Research model.

II. RESEARCH METHOD

A. Sample

Respondents of this research were students of the Universitas Negeri Padang. A representative of the student population was included in the sample. Only responses from those who had previously used the digital library were included. After careful examination and excluding incomplete responses, totally 400 samples of those with experience of the system were retained for data analysis. Among them, 68 % were female student and one-fourth respondents used digital library for 30 minutes in a week.

B. Research Instrument

The question items are used to manifested the constructs are adapted from the previous research relevance to the digital library. Totally, there are 61 items, that each is 7 items for actual system use, 19 items for perceived ease of use, 25 items for perceived usefulness and 10 items for attitude toward using. All items for each construct are measured using five-point Likert scale with achors ranging from strongly disagree to strongly agree for all questions.

III. DATA ANALYSIS AND RESULTS

A. Measurement Model

A Structural Equation Modeling using Partial Least Square (PLS) 2.0 was conducted to analyze the data. Measurement model was evaluated based on validity and reliability of instrument. Validity of instrument was tested and determined by convergent and discriminant validity. Convergent validity was measured by correlation between component score and construct score and considered to be high when factors loadings greater than 0.50 [9]. In order to achieve a better convergent validity, one item of actual system use (ASU), five items of perceived ease of use (PEU), and one item of perceived usefulness re deleted. After reestimation, the test results showed that all indicators have convergent validity with loading factor greater than 0.50, with most of them above 0.70. Therefore, all constructs in the model had adequate convergent validity (figure 3).

Discriminant validity was evaluated by cross loading or correlation between indicator of construct to others construct. All construct was considered have discriminant validity when correlation between indicator and its construct greater than correlation between indicator and others construct. After examination, correlation between indicator and its construct greater than others construct.

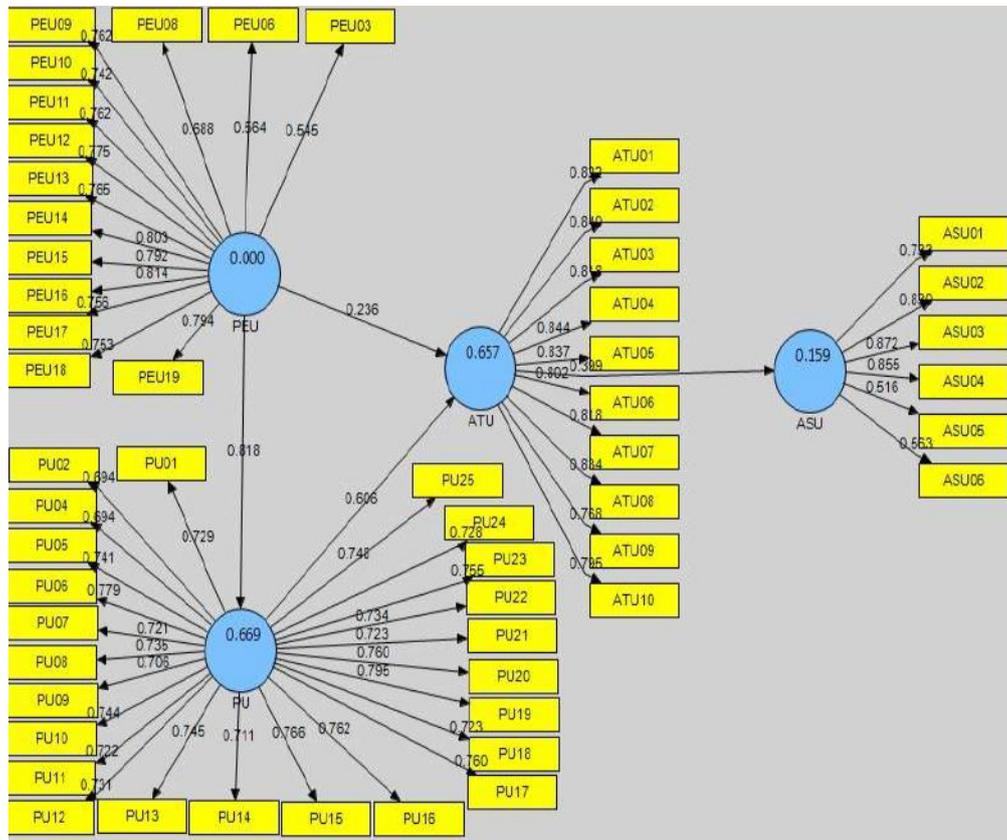


Fig. 3. Loading factor of constructs indicator after re-estimate.

The other measure for discriminant validity criteria is by consider average variance extract (AVE) score. Construct has discriminant validity if $AVE \geq 0.5$.

TABLE I. AVERAGE VARIANCE EXTRACT (AVE) OF VARIABLES

Variables	AVE
Actual System Use	0.550
Attitude Toward Using	0.669
Perceived Ease of Use	0.549
Perceived Usefulness	0.545

The average variances extract for all variable are above the recommended 0.50 level, which meant that more than one-half of the variances observed in the items were accounted for the by their hypothesized construct. Reliability of construct were estimated by Cronbach's alpha and composite reliability. Based on testing, Cronbach's alphas for all constructs were above 0.70 as well as composite reliability.

TABLE II. VALIDITY OF VARIABLES

Variables	Composite Reliability	Cronbach Alpha
Actual System Use	0.876	0.828
Attitude Toward Using	0.953	0.945
Perceived Ease of Use	0.944	0.936
Perceived Usefulness	0.966	0.964

Cronbach's alpha for all constructs were above the 0.80 and the composite reliability produced very similar results. Therefore, all constructs had adequate reliability.

B. Structural/Inner Model

Structural model was evaluated with R-Square, goodness of fit and path significance of variables. The test results showed R-Square range from 0.16 to 0.67.

TABLE III. R-SQUARE

Variables	R-Square
Actual System Use	0.16
Attitude Toward Using	0.66
Perceived Ease of Use	-
Perceived Usefulness	0.67

Table 3 explains that the actual use of digital libraries is influenced by user attitudes about digital libraries by 16 percent and rest is influenced by other variables. Meanwhile, user attitude toward using digital libraries influenced by perceived ease of use and perceived usefulness about digital library by 66 percent. In addition, user perception about usefulness of digital library is influenced by perceived ease of use by 67 percent.

Accuracy of the research model with data can be evaluated by goodness of fit (GoF). that can be assessed using formula of Tennenhaus [10]:

$$GoF = \sqrt{Com \times R^2}$$

According to Tennenhaus, GoF 0.1 is small, 0.25 is medium, and 0.449 is large. Based on calculation, the GoF's value for this model is 0.38 which is categorized as medium. Overall, the model has good predictive ability. Therefore, we could proceed to examine the path coefficient and hypotheses of the structural model [10].

TABLE IV. HYPOTESIS TESTING

Variables	Beta	t-value
PEU → PU	0.818	41.346
PEU → ATU	0.236	4.571
PU → ATU	0.606	12.828
ATU → ASU	0.399	10.145

Result obtained from the structural equation modeling at Table 4 indicated that all hypotheses are supported. Perceived ease of use has significant influence on perceived usefulness. This finding indicates the digital library will be useful if easy to use. The result of hypotheses testing also proved perceived ease of use and perceived usefulness have significant effect on attitude toward using digital library. In turn, attitude toward using digital library has a significant influence on actual system use.

IV. DISCUSSION

This study tested technology acceptance model in context of a digital library. There is a significant effect perceived ease of use on perceived usefulness. Its mean, if students feel the ease of using digital library then automatically the students also feel the benefits of the digital library system. Digital libraries that are perceived as easy to use, easy to learn, easy to control, clear, and easy to understand, will be considered useful by students, in otherwise, the system is considered difficult to use would not be used by students because it is not useful at all. In turn, a system that is easy to use and useful will lead to a positive attitude. This finding support Ghina et al. that perceived ease of use significantly attitudes toward using UNEJ repository [11].

This research also reveals that attitude toward using digital libraries have positive significant impact on actual digital library usage.

Finding of this research confirms Al-Gahtani and King [12]. This finding is also strengthening the finding research of Chau and Hu, indicating that perceived ease of use perceptions and perceived usefulness perceptions are the determinants of attitude toward using [13].

V. CONCLUSION

The actual digital library usage is strongly influenced by the awareness and ability of the students to use the technology. Two belief constructs of Technology Acceptance Model by Davis, namely perceived usefulness and perceived ease of use proved to affect the attitude of users in digital library usage [4]. A positive attitude in the form of user acceptance of the digital library arises because the users feel the benefits and ease of use of digital libraries.

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