

# Effects of Ease of Use, Effectiveness, and Use Frequency on User Satisfaction in Academic Library Website Uses

Soohyung Joo  
School of Information Studies  
University of Wisconsin-Milwaukee,  
P.O. Box 413, Milwaukee, WI  
+1-414-793-1748  
sjoo@uwm.edu

## 1. INTRODUCTION

For undergraduate and graduate students, library website services such as an online library catalog, electronic resources, and online reference services are considered imperative in achieving their academic goals. To satisfy student users, it is important to develop a user-friendly website based on precise understandings of factors associated with user satisfaction. There are various factors affecting satisfaction such as availability, resource quality, usability, and service quality, and many studies have investigated causal relationships between various factors and user satisfaction in the context of academic library web-based services. This research investigated the effects of three variables, ease of use, effectiveness, and use frequency, on satisfaction in using a university library website.

## 2. RESEARCH QUESTION

The research question was established as: how use frequency, ease of use, and effectiveness affect users' satisfaction in uses of university library websites?

## 3. METHODOLOGY

### 3.1 Sampling

The participants of this research were students of Yonsei University (www.yonsei.ac.kr) in Korea. The number of valid respondents was 191, which consist of 119 undergraduate students and 72 graduate students.

### 3.2 Operationalization of Concepts

This study identified four concepts: (1)frequency of use, (2)ease of use, (3)effectiveness, and (4)satisfaction. Each concept was operationalized as following:

- *Use frequency* refers to how frequently a user uses a library website.
- *Ease of use* refers to the extent how easy a user perceives a library website when using it.
- *Effectiveness* refers to how successful is when a user performs his/her specific information seeking tasks.
- *Satisfaction*: Freedom from discomfort, and positive attitudes towards the use of the website [1].

### 3.3 Measurement

In this research, three independent variables and one dependent variable were identified:

- X0 (categorical variable; coded as E1 and E2 vectors) – Use frequency
- X1 (continuous variable) – Ease of use
- X2 (continuous variable) – Effectiveness
- Y (continuous variable) – Satisfaction

The variable of “use frequency” was a categorical variable that indicates how frequently a participant uses a university library website. This categorical variable consists of three different categories: (1)more than once a week; (2)more than once a month (but less than once a week); and (3)less than once a month or never use. For this poster, each category is named as “group 1” for “more than once a week”, “group 2” for “more than once a month” and “group 3” for “less than once a month or never use”. The other three variables – “ease of use,” “effectiveness,” and “satisfaction” – were continuous variables, and the respondents were asked to rate their perceptions using seven-point Likert scale. For simplicity, each variable is presented using a code – X0 (E1 and E2), X1, X2, and Y – respectively

### 3.4 Strategy of Analysis

To answer the research question, this study adopted a multiple regression with three independent variables involving one categorical variable and two continuous variables. This regression model also examined whether the significant interaction effects occurred between X0 and X1, X2. The Figure 1 shows the research design of this study. For the coding of categorical variable that has three categories, an effect coding method was employed.

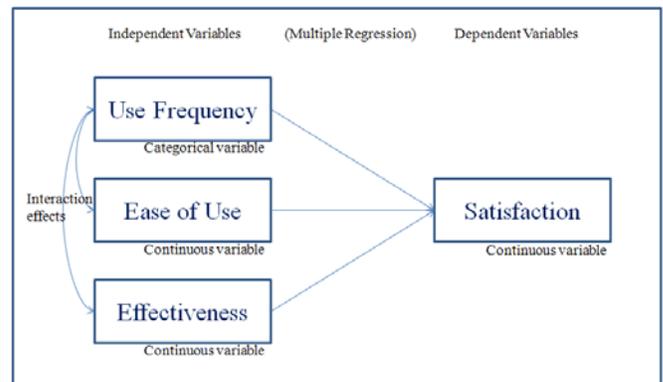


Figure 1: Research design

#### 4. RESULTS

A descriptive statistics of each variable was investigated. 57.9% of participants answered they used library website more than once a week. 23.6% of respondents used more than once a month, but less than once a week, and 18.5% answered less than once a month. For the continuous variables, the mean values of X1, X2, and Y were 3.91, 4.26, and 5.30, respectively.

To investigate how X0(use frequency), X1(ease of use), X2(effectiveness) affect Y(satisfaction), a multiple regression was conducted. For the X0, an effect coding using two vectors (E1 and E2) was applied. Then, the independent variables were entered into the analysis using three different blocks to see the R-square change to find the most appropriate regression model. Three

different models of regression were identified(Table 1): “model 1” included only E1 and E2 (vectors of X0); “model 2” involved E1, E2, X1, and X2; and “model 3” included E2, E1, X1, X2, and the interaction effects between E1 and E2 and X1 and X2. Table 1 shows the R-square of each model and its change. “Use frequency (E1 & E2),” “ease of use (X1),” “effectiveness (X2),” and “their interaction effects” accounted for approximately 22.6% of the variance of “satisfaction (Y).” The F change from “model 2” that included main effects of X0, X1 and X2 to “model 3” that included three main effects and the interaction effects of E1 and E2 and X1 and X2 turned out to be 1.311, but it was not significant at the 0.05 alpha level.

Table 1. R-squares and their changes in regression models

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.238 <sup>a</sup>	.057	.047	1.303	.057	5.667	2	188	.004
2	.451 <sup>b</sup>	.203	.186	1.204	.147	17.108	2	186	.000
3	.475 <sup>c</sup>	.226	.192	1.200	.022	1.311	4	182	.268

a. Predictors: (Constant), E2, E1

b. Predictors: (Constant), E2, E1, X1, X2

c. Predictors: (Constant), E2, E1, X1, X2, Interaction of E1\*X2, Interaction of E1\*X1, Interaction of E2\*X2, Interaction of E2\*X1

Since the interaction effects between E1 and E2 and X1 and X2 were not significant, a multiple regression with the independent variables of X0 (E1 & E2), X1 and X2 was conducted, excluding interaction terms (Table 2). The result shows that the satisfaction scores were regressed on use frequency, ease of use, and effectiveness. These predictors accounted for approximately 20%

of the variance in satisfaction scores, which was significant,  $F(4,186) = 11.873, p < .05$ . Both the ease of use ( $b = .153, p < .05$ ) and the effectiveness ( $b = .373, p < .05$ ) demonstrated significant effects on the satisfaction scores.

Table 2 Coefficients of regression model

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.994	.414		7.227	.000		
	E1	.307	.121	.176	2.539	.012	.893	1.120
	E2	-.111	.146	-.053	-.760	.448	.892	1.121
	X1	.153	.072	.139	2.117	.036	.998	1.002
	X2	.373	.068	.374	5.505	.000	.928	1.077

a. Dependent Variable: satisfaction

To analyze further, the separate regression equations were calculated for three different groups by use frequency. Since the coefficients of main effects of X1 and X2 were significant ( $p < .05$ ), a regression equation for each group by use frequency was able to be obtained. The overall regression equation for three identified groups, not including the interaction term, was “ $Y' = 2.994 + 0.307*(E1) + (-0.111)*(E2) + 0.153*(X1) + 0.373*(X2)$ .” From this, three different separate regression equations were obtained, which have common regression coefficients, but different intercepts:

- (For group1):  $Y' = 3.301 + 0.153*(X1) + 0.373*(X2)$

- (For group2):  $Y' = 2.883 + 0.153*(X1) + 0.373*(X2)$

- (For group3):  $Y' = 2.798 + 0.153*(X1) + 0.373*(X2)$

These separate regression equations revealed that the participants who used the library web services more frequently would be likely to perceive higher satisfaction if the conditions of X1 and X2 are same. From this multiple regression, we conclude that use frequency, ease of use, and effectiveness would affect user satisfaction in using university library website, but there were no interaction effects between these three independent variables.

## 5. CONCLUSIONS

This study investigated how use frequency, ease of use and effectiveness affect the users' satisfaction in the uses of university library web services. The result of regression analysis shows that use frequency, ease of use, and effectiveness would affect the satisfaction, but there was no significant interaction effect. The main effect of effectiveness was more influential on the satisfaction than the ease of use.

These findings yield practical implications for web-service designs for academic libraries. First, effectiveness is more closely related to user satisfaction than ease of use, so when developing a web-based service in academic library, the effectiveness could be more emphasized than ease of use to improve user satisfaction. Also, users who use the library website less frequently are likely to be less satisfied. Thus, to enhance the satisfactory levels of users with

less frequent uses, it will be required to understand specific needs of them.

However, this research also has its limitations. The R-square value could be enlarged to explain more proportion of the satisfaction. To do this, it is needed to involve more factors affecting the satisfaction. The three variables investigated in this research are not sufficient to explain sufficient proportions of the satisfaction. Further research can be designed to include more independent variables such as availability, service quality, and others.

## 6. REFERENCE

[1] International Standard Organization (ISO). 'ISO 9241-11: Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs)', Part 11: Guidance on Usability Specification and Measures. Technical report, 1997.