

Usability Analysis of Website-based Applications by Adopting User Satisfaction Models

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Abstract— Technological developments in supporting and assisting all human work activities are felt to be equally beneficial. *Shirouoshien* is a business that is engaged in commerce and offering products that it sells to its customers. *Shirouoshien* uses a website-based application to promote products more efficiently. Evaluation of the *shirouoshien* application aims to find out how the usability of the website is for users. In general, the criteria that determine that a website is usable (has a high level of usability) is if users can find and get what they need and understand from the *Shirouoshien* website. The main problems to be examined in this study then the problem will be broken down into several. The main issues need to be considered in the usability analysis of website-based applications, variables that influence user acceptance of the application in the usability framework, and factors that describe the acceptance and use of website-based applications. In general, through analysis of the usability aspect in the next development plan framework, this application still needs further improvement and development to meet customer needs regarding products and product promotion. The results and general discussion through usability aspect analysis in the next development plan framework still need further improvement and development to meet customer needs related to products and product promotion.

Keywords— Usability Analysis, Website-Based, User Satisfaction Model.

I. INTRODUCTION

Technological developments in supporting and assisting all human work activities are felt to be equally beneficial. Technology is one of the information media needed in human life to get faster and more precise information. As an information medium, it cannot be separated from the need for an internet network. The internet is a network that unites the network to communicate, exchange information in the form of files, videos, sound, and so on [1]. One of the benefits that can be felt from technology support is in websites [2].

Use of the website as a forum for sharing information, sharing events that occur, job information, etc. Companies use Web-based applications to support company activities or get the information needed [3]. A website is a medium widely used to disseminate information and promotion widely in a company [4]. *Shirouoshien* has a website address www.shirouoshien.com, a website that utilizes technology to disseminate information and promotions that can provide great benefits for owners and users because it can be accessed anytime and anywhere online that users can quickly obtain information and can access from anywhere and anytime. The website will provide online services to users rapidly as expected by information users.

The *shirouoshien* website includes information about products sold and ongoing promotions in the *shirouoshien* business. What is shared are product prices, product photos, product descriptions, product types and colors, ordering methods, transaction methods, etc.[5]. This is so that users get accurate information in accessing the latest things from *Shirouoshien* so that users do not have to wait or confirm to the admin about the availability of goods.

The making of the website application has been completed, and to determine the quality of the information system, it is necessary to measure its usability [6]. Usability is the quality level of a system that is easy to learn, easy to use, and encourages users to use it as a positive tool in completing tasks [7]. Evaluation of the *shirouoshien* application aims to find out how the website's usability is for users [8].

In general, the criteria that determine that a website is usable (has a high level of usability) is if users can find and get what they need and understand from the *Shirouoshien* website. To make it easier to understand the main problems, examine what aspects need to be considered in website-based applications' usability analysis. What are variables that influence user acceptance of the application in the usability framework? How do these factors describe the acceptance and use of web-based applications?

The formulation of the problem is intended to determine what aspects need to be considered in developing website-based applications, Knowing user acceptance of the *Shirouoshien* application in the usability framework, knowing how the variables are connected with the user's approval of the application based on the *shirouoshien* website. Usability is defined as optimizing the interaction between the user and the system that can be done interactively to get the right information or complete an activity in the application better. A website-based application is to be more effective, efficient, and can allow users to complete their activities in the application.

II. RESEARCH METHODOLOGY

Usability in testing an application based on the *Shirouoshien* website is survey research. Survey research is

research that takes samples directly from the population [9]. Judging from the problem, it aims to analyze the relationship and influence (cause-effect) of two or more phenomena through hypothesis testing. The research model used is a research model Green and Pearson [10] shown in Figure 1 described in the research model Green and Pearson.

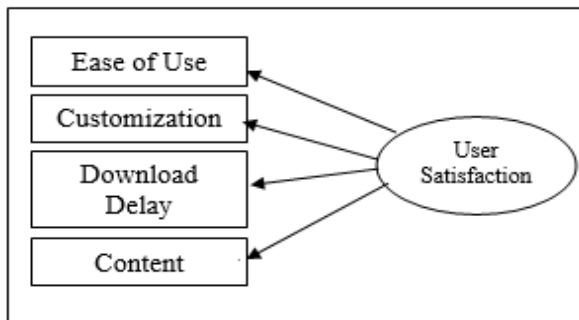


Figure 1. Research Model Green and Pearson

Research subjects are application users who have purchased and used application services [3]. The sample is an element of the population chosen to represent the study population [11]. Sampling used the random sampling method, namely sampling that provides an equal opportunity to be taken to each population element [8]. This method also uses criteria for the sample. The criteria set are people who have access rights to the application in login data and the *shirouoshien* website's password.

The data collection method is done by using a questionnaire survey method for application users [9]. Surveys are conducted to obtain feedback on user perceptions of the application. The data used in this is primary data [12]. Primary data is data obtained directly from online questionnaires on the website [13]. The application is used as a promotional medium and distributes questionnaires to the samples in this data collection.

The sample size is adjusted to the analysis model used, namely *Structural Equation Model* (SEM) [14]. In this regard, the SEM sample size is 100-120 samples or as much as 5-10 times the estimated number of variables. Therefore, the required number of respondents should be 120 respondents. A variable is something that differentiates or varies the value [15]. The value can be different at different times, even if it is aimed at the same object or person. Following the analysis model used is the Structural Equation Model (SEM). The variables used include exogenous variables, indicator variables, and endogenous variables as described in Table I. Definition of Variable Constructs Research is a table that describes the indicators of each variable construct in Table I.

TABLE I
 RESEARCH VARIABLE CONSTRUCT DEFINITION

Construct	Indicators	Code
Ease of use	Serving structure	X1
	Ease of access	X2
	clarity of presentation of information	X3
Customization	Interesting material	X4
	Personalization	X5

Construct	Indicators	Code
Download delay	Speed of finding information	X6
	Control over material	X7
Content	Information specifications	X8
	Fulfillment	X9
	Sufficiency of material	10
Satisfaction	Convenience	Y1
	Continue to access the website	Y2

The main instrument is a questionnaire [10]. Measurement of variables is carried out using a Likert scale, namely the scale used to measure attitudes, opinions, and perceptions, according to the equivalent of giving a score to each alternative answer [6]. The measurement procedure is that respondents are asked to state their agreement based on each respondent's perceptions. The answer consists of seven choices, namely: Vey Strongly Disagree (VSD), Strongly Disagree (SD), Disagree (D), Neutral/No Argue (N), Strongly Agree (SA), Very very Much Agree (VVMA). Filling in the questionnaire form will be associated with the website application database username, so the questionnaire data will not record the results of the questionnaire as valid data. Apart from that, if not all of the customers filled out the questions, the data was considered invalid.

Giving value (scoring) is done for answers strongly agree, a value of 7, and so on decreases until the answer is very strongly disagreed, given a value 1. The weight of the respondents' answers can be seen in Table II.

TABLE II
 THE WEIGHT OF THE RESPONDENT ANSWER

Answers	Abbreviation	score
Very strongly disagree	VSD	1
Strongly Disagree	SD	2
Disagree	D	3
Neutral/no argue	N	4
Agree	A	5
Strongly agree	SA	6
Very very much agree	VVMA	7

III. RESULT AND DISCUSSION

The data collection method using a questionnaire. In this case, the respondent's subject is a *shirouoshien* business customer who buys and needs *shirouoshien* product information. The data collection results are in the form of a questionnaire that has been successfully stored and is suitable for analysis user invalid is 1.5%, incomplete filling questionnaire 4.7% and the questionnaire is eligible 93.8%. For more detailed data, see Table III. The results of data collection.

TABLE III
 THE RESULTS OF DATA COLLECTION

information	Total	%
A questionnaire with <i>user</i> invalid	5	1.5
Incomplete filling questionnaire	16	4.7
The questionnaire is eligible	319	93.8
Total	339	100

The number of questionnaires distributed to *shirouoshien* business customers obtained questionnaire data with many invalid users 5 (1,5%) invalid after as many username and

passwords 16 (4,7%) incomplete and the rest 318 (93,8%) filling is complete. This data can be made into a flowchart (path diagram) of the quality relationship between the construct and its indicators. The path analysis was developed to study the effect of the independent variable's direct and indirect effects on the dependent variable. The path analysis used is illustrated in Figure 2 Path analysis.

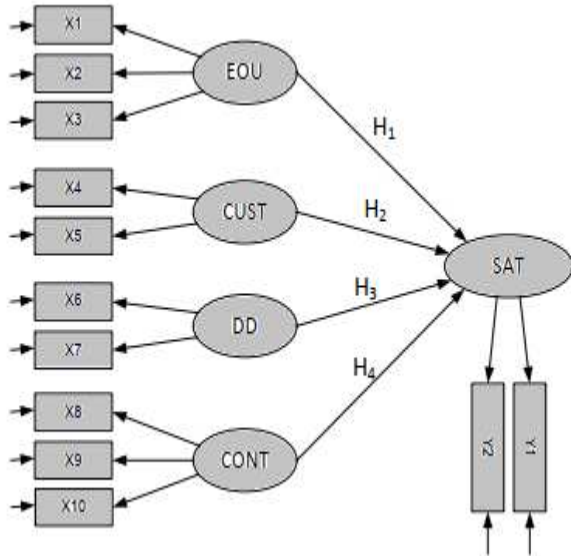


Figure 2. Path analysis

A good model is influenced by the indicator validity and construct reliability. Therefore, it is necessary to test the validity and reliability of the model from the data obtained. Based on the formation of the structural equation, the following is a measurement model. The application used is a LISREL application that is intended for modeling calculations, including structural equation modeling, multilevel structural equation modeling, multilevel linear and nonlinear models, and so on. The data that has been obtained from the survey results are then entered into the measurement model as a theoretical basis for measuring user satisfaction using the application LISREL 8.80. The validity testing is used to identify that unobserved variable through confirmatory factor analysis (CFA). If the value *factor loading* of each construct more than 0,5 ($\lambda > 0,5$), then declared valid. The estimation results in Table IV. Regarding the loading factor of all valid indicators and the model evaluation process can be continued.

TABLE IV
 VALUE LOADING FACTOR INDIKATOR

Construct	Kode	Loading factor
Ease of use	X1	0.77
	X2	0.86
	X3	0.73
Customization	X4	0.80
	X5	0.67
Download delay	X6	0.86
	X7	0.71
Content	X8	0.91
	X9	0.91

Construct	Kode	Loading factor
Satisfaction	I0	0.96
	Y1	0.89
	Y2	0.72

Based on the estimates as shown in Table IV. Obtained loading factor data from all indicators is not less than 0.50. thus, all indicators can be declared valid, and the model evaluation process can be continued. The measurement model's reliability is used *composite reliability measure* (composite reliability measure) and *variance extracted measure* (variant extract size).

TABLE V
 MODEL RELIABILITY TEST RESULTS

Construct	CR	VE	Explanation
Ease of use	0.8265	0.6146	Good reliability
Customization	0.7061	0.5476	Good reliability
Download delay	0.7621	0.6177	Good reliability
Content	0.9485	0.8599	Good reliability
Satisfaction	0.7807	0.6429	Good reliability

The composite reliability of a construct is calculated as Equation (1)

$$Construct_Reliability = \frac{(\sum std. loading)^2}{(\sum std. loading)^2 + \sum e_j} \quad (1)$$

Seen the results of the model reliability test in Table V. The results of reliability calculations are obtained *construct reliability* (CR) > 0.7. As for the variant extract, it can be calculated with the following Equation (2).

$$Variance_Extracted = \frac{\sum std. loading^2}{N} \quad (2)$$

For all value Variance Extracted (VE) > 0.50. thus concludes that the reliability of the measurement model (Kontruk) is well based on table V. The goodness index *of fit* can be seen in Table VI. The calculation goodness of fit results index.

TABLE VI
 THE RESULT OF GOODNESS OF FIT CONSTRUCT INDEX CALCULATION

Criteria	Result Model	Critical Value	Conclusion
X2 Chi-square	62.26	Small	<i>Be accepted</i>
Significance probability	0.03620	$\geq 0,05$	<i>Pretty goog</i>
RMSEA			
GFI	0.036	$\leq 0,08$	Good
AGFI	0.97	$\geq 0,90$	Good
CMIN/DF	1.1416	$\leq 0,90$	Good
TLI	0.99	$\geq 0,90$	Good
CFI	0.99	$\geq 0,95$	Good

Testing the hypothesis of the structural model that is formed, the coefficient of the relationship between variables is obtained. The coefficient consists of the relationship between the latent variables and the latent variable formation's manifest variables' contribution value. The relationship that occurs in this structural model is the basis for evaluating the

hypothesis. The significant level of each connection between latent variables is seen from t-value must be greater than 1.96 for positive relationships and less than -1.96 for negative relationships (level of trust $\alpha = 0.05$). Based on the calculations results, the researcher needs to perform model respecification to improve the data. *Ease of use* application and user satisfaction have the first hypothesis (H1), which reads: ease of use on the application *shirouoshien* website directly influences customer satisfaction.

The results show that operating the *shirouoshien* application (ease of use) does not directly affect the satisfaction (satisfaction) of *shirouoshien* website visitors. The results show that operating the *shirouoshien* application (ease of use) does not directly affect *shirouoshien* website visitors' satisfaction. In this model, it is also known that the ease of use aspect tends to have a more negative influence on the satisfaction of *shirouoshien* website visitors. So it needs to be understood that visitors to this application website tend to want to find more specific information and do not pay attention in general to the use or operation of the *Shirouoshien* application. The second hypothesis (H2) reads: Customization on the application website directly affects visitor satisfaction. The research results provide information that the website's appearance can be presented in a personal way and different in presentation (customization) between visitors or customers to one another on the *shirouoshien* website.

From the coefficient value on the results of the research model respecifications, it can be seen that the customization aspect explains 16% of the variation in the aspects of application visitor satisfaction. In this model, it is known that the customization aspect tends to hurt visitor satisfaction *shirouoshien* websites. So it can be concluded that further development regarding website-based promotional applications is considering this hypothesis's results. In common language, website visitors are not too concerned with access speed than applications.

Download delay and user satisfaction in the third hypothesis (H3) states that the application process's speed (download delay) on the application website directly affects visitor satisfaction. Based on the value of the coefficient on the results of the research model respecification, it can be seen from the variation in the aspects of application visitor satisfaction that the download delay aspect tends to have a more positive influence on visitors' satisfaction the *shirouoshien* website.

Content and user satisfaction are the fourth hypothesis stating that the content of the material on the *shirouoshien* website directly affects visitor satisfaction. This aspect explains that the content of the *shirouoshien* website material can contribute to website visitors' satisfaction. From the coefficient value obtained from the model respecification results, it can be seen that the content aspect explains 42% of the variations in the customer satisfaction aspects of this application. It can be seen that the content aspect tends to have a positive influence on customers or website visitors.

IV. CONCLUSION

Based on the results of the analysis above, it can be concluded that firstly, the ease of using the application does not have a direct positive effect on user satisfaction of the *Shirouoshien* website application. Second, display information specifically for each *shirouoshien* website visitor. Third, the speed of data access and processing in applications does not directly affect customer satisfaction. Fourth, the presentation of information related to company product and service rates has an immediate positive effect on customer satisfaction. Fifth, in general, through analysis of the usability aspect in the framework of further development plans, this application still needs further improvement and development to meet customer needs related to products and promotional products.

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