

DEVELOPMENT OF INSTRUMENT FOR EVALUATING WEBSITE USABILITY FOCUSING ON UNIVERSITY WEBSITE

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ABSTRACT. It is crucial to develop the instrument for evaluate website usability. It's important to test the questionnaire instrument before using it to collect data in actual study. Recently, there are only a few studies that include an evaluation by experts, then a pre-test with focus group and pilot test with respondents in testing the instrument. The initial instrument for this study is 60 item questionnaires. After going through 3 stages, the final instrument has 45 items of the questionnaire. The questionnaire instrument has been tested in 3 stages to ensure the construct validity and give confidence to the researcher about the instrument before distribute it for actual study. It also investigated whether the respondents understood and responded to the questionnaire instrument. Thereby, reducing incomplete data and non-response to ensure face validity and reliability.

Keywords: website, usability, questionnaire, experts, pre-test, pilot test

INTRODUCTION

There is no doubt that the website is very important to company or organization (Ramli, 2010) (Lee & Kozar, 2012). Usability is an attribute that gives impact or influences the quality of a website (Madan & Dubey, 2012). There are various definitions or terms of usability such as Shackel (1991) defined as “usability of a system or equipment is the capability in human functional terms to be used easily and effectively by the specified range of users, given specified training and user support, to fulfil the specified range of tasks, within the specified range of environmental scenarios”. ISO 9126 (1991) defined usability as “a set of attributes that bear on the effort needed for use, and on the individual assessment of such use, by a stated or implied set of user”. Nielsen (1993) referred to usability attributes as learnability, efficiency, memorability, error, and satisfaction. (Leventhal & Barnes, 2008) (Madan & Dubey, 2012). Based on ISO 9241 – 11 in HCI field, usability is defined as the “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” (Fernandez, Insfran, & Abrahão, 2011; Marsico & Levialdi, 2004). However, because of the lack of fundamental theories of website usability, the previous studies had proposed different sets of website usability factors; used different terminology and scope; and investigated different nomological networks between usability factors and online customer perceptions (Lee & Kozar, 2012). Therefore, the previous studies did not provide coherent lenses to observe and explain the distinct contribution of website usability. There still a room for improvement because some of the study did not fully investigate the causal network of variables, attitude and behavioural intention (Lee & Kozar, 2009). This study is proposed a website usability that evaluates the higher education institution or university website. The attributes that proposed in this study also taking a characteristic that proposed

by MAMPU such as accessibility (Corporation, 2013; Unit Pemodenan Tadbiran, 2006). The efficiency, effectiveness and satisfaction element are selected based on ISO 9241 usability characteristic (Science, 2012; Vidrio-baron, Townsend, & Shelley, 2009). 8 attributes are selected that are identified are important to evaluate website usability focusing on higher education institution website or university website which are efficiency, effectiveness, learnability, accessibility, satisfaction, navigability, content and interface/design. Table 1 is the initial list of construct and item.

Table 1. Initial List of Construct and Item for Questionnaire Instrument

Construct	Code	Item	Reference
Efficiency	EY1	When I use the Web site there is very little waiting time between my actions and the Web site's response.	(Loiacono, Watson, & Goodhue, 2007)
	EY2	It is easy to find the information that I need	CSUQ
	EY3	I am able to efficiently complete my work using this website	CSUQ
	EY4	I can effectively complete my work using this website	CSUQ
	EY5	I believe I became productive quickly using this website	CSUQ
Effectiveness	EV1	On this website, it is simple to accomplish the task I want to accomplish.	(Wang & Senecal, 2008)
	EV2	I find it easy to get this Web site to do what I want it to do	(Palmer, 2002)
	EV3	I am able to complete my work quickly using this website	CSUQ
	EV4	It was simple to use this website	CSUQ
	EV5	The information is effective in helping me complete the tasks and scenarios	CSUQ
Satisfaction	S1	I feel comfortable using this website	CSUQ
	S2	This website has all the functions and capabilities I expect it to have	CSUQ
	S3	I am satisfied with how easy it is to use this web site	CSUQ
	S4	I am satisfied with this web site	CSUQ
Learnability	L1	Learning to operate the Web site is easy for me.	(Loiacono et al., 2007)
	L2	I find the Web site easy to use.	(Wang & Senecal, 2008)
	L3	All the material is written in a way that is easy to understand.	WAMMI
	L4	Using this website for the first time is easy.	WAMMI
	L5	The contents provided by the website are easily understood	(Lee & Kozar, 2012)
	L6	The website is designed for easy understanding	(Lee & Kozar, 2012)
	L7	The information provided by the website is easy to understand	CSUQ
	L8	It was easy to learn to use this web site	CSUQ
Accessibility	AC1	The website offers customization.	(Wang & Senecal, 2008)
	AC2	It was easy to move from one page to another	(Poelmans, Wessa, Milis, Bloemen, & Doom, 2008)
	AC3	The text on the website is easy to read	(Loiacono et al., 2007)
	AC4	It takes time to open the web page or download the web page	Self develop
	AC5	It has a accessibility function on the web site (can resize text, change the background color etc)	Self develop
	AC6	The website's wording is clear and easy to understand	(Lee & Kozar, 2012)
	AC7	The website uses colors and structures that are easy on the eyes	(Lee & Kozar, 2012)
	AC8	The pages download quickly on this website.	(Wang & Senecal, 2008)
Navigation	N1	I can easily navigate this site.	(Cyr, 2013)
	N2	This site provides good navigation facilities to information content.	(Cyr, 2013)
	N3	I like the way hyperlinks are embedded in this site's design	(Zhang, Keeling, & Pavur, 2000)
	N4	I feel in control when I'm using this web site	WAMMI
	N5	I get what I expect when I click on things on this website.	WAMMI
	N6	The navigation and labels on this Web site were clear.	(Downing & Liu, 2011)
	N7	Links are consistent and easy to identify	(Meyers, 2009)

	N8	The website provides multiple search features (e.g: search engine, menu bar, go-back-and-forward button, etc) to obtain the target information	(Lee & Kozar, 2012)
	N9	It was easy to move from one page to another	(Poelmans et al., 2008)
Content	C1	I trust the Web site to keep my personal information safe.	(Loiacono et al., 2007)
	C2	I can trust this website.	(Cyr, 2013)
	C3	I trust the information presented on this website.	(Cyr, 2013)
	C4	The information provided at this site is sufficient.	(Cyr, 2013)
	C5	The website adequately meets my information needs.	(Cyr, 2013)
	C6	I find the information on this site to be well organized	(Cyr, 2013)
	C7	I feel this Web site clearly stated its purpose for using the site	(Downing & Liu, 2011)
	C8	The website provides up-to-date information	(Lee & Kozar, 2012)
	C9	The information (such as online help, online messages, and other documentation) provided with this website is clear	CSUQ
	C10	The organization of information on the website pages is clear	CSUQ
Interface / design	ID1	The website repeats the same structure, components and overall look across pages.	(Lee & Kozar, 2012)
	ID2	Web pages in the website are consistently designed	(Lee & Kozar, 2012)
	ID3	This web site is presented in an attractive way. (i.e. colors, images, layout etc)	WAMMI; (Cyr, 2013)
	ID4	The pages on this website are very attractive.	WAMMI; (Cyr, 2013)
	ID5	The layout of pages made tasks easier.	(Downing & Liu, 2011)
	ID6	The interface of this web site is pleasant	CSUQ
	ID7	I like using the interface of this web site	CSUQ
Intention to reuse	ITU1	I intend to use this website again	(Poelmans et al., 2008)
	ITU2	I would be willing to visit this website again	(Downing & Liu, 2011)
	ITU3	I feel this website reflects most current trend(s) and provides nice design for the site visit	(Downing & Liu, 2011)
	ITU4	I will reuse this website again	(Poelmans et al., 2008)

This study evaluates the questionnaire to 3 stages to ensure the questionnaire instrument validity and reliability and the respondents understood and responded to the questionnaire instrument. Thereby, reducing incomplete data and non-response. Content validity is an important method in developing the questionnaire instrument. The approach can ensure the construct validity and give confidence to the researcher about the instrument before distributing it for pilot study or actual study. The feedback and comments from the experts give the researcher to see the instruments in the width direction and focusing to the specific element to evaluate the website usability. In this study, pre-test was used as a validity check to identify problem and repair potential errors. The aim was to investigate whether respondents understood and response to the questionnaire instrument. This is important for future use at the instrument, thereby reducing incomplete data and non-response. In this study, end user are the focus group that need to evaluate the website usability because they use regularly and know that the lack of the websites.

METHODOLOGY

For the instrument for this study, questionnaire from Computer System Usability Questionnaire (CSUQ) and WAMMI were adapted and also include a few question that refer to the item constructs that used. Higher education institution websites are chosen to evaluate the proposed usability model. Evaluating website usability is of significant importance to the success of higher education websites (Broberg, 2011). Higher education institution websites often contain important information about academic resources, campus events, and administrative policies. As higher education websites take on significant and increasingly important roles, it is imperative that these sites are user-friendly. Before distributed to the real respondents in actual study, the instrument has gone a few evaluations. In this research, the real respondents are the student

because the researchers want to see the student perceptive when using the university website. They are one of the end users and used the university website often in order to gather information that relates to them. The instrument is known as Questionnaire for Website Usability (QWU). The instrument has 9 constructs namely Effectiveness, Efficiency, Satisfaction, Learnability, Accessibility, Navigation, Content and Interface/design for Independent Variable (IV) factors and Intention to Use as a Dependent Variable (DV).

The initial questionnaire instrument is known as QWU_1 that has 9 constructs and 60 items. First the QWU_1 need to evaluate by experts to see with the item is important and reflects to the construct. Content validity by expert means that the instrument covers the content that it is supposed to measure based on expert view (Yaghmale, 2003). The instrument has undergone reviewed process by 5 experts in website and usability studies. This process takes about a month to gather all the results from the experts. The first part of the questionnaire contains a demographic profile of expert, including gender, age, current position, education level, experience in teaching or in industry and involvement in website or usability field. A five-point Likert-type scale ranging from (1)“Extremely unimportant”; (2)“Unimportant”; (3)“Less Important”; (4)“Important” and (5)“Extremely Important” was used to evaluate the 60 item of the questionnaires. This instrument also includes suggestion or comment in each of constructs.

Pre-test for the questionnaire instrument is done with potential respondents which are students to have good reliability. After experts review the instrument, pre-test are conducted using QWU_2 with 30 respondents. 30 respondents were contacted and agreed to participate in this pre-test. The respondents are grouped into 6 groups consists 5 persons per group. The respondents are given a set of questionnaire instrument and need to give their response to the instrument. The researcher also involves in this pre-test session with the respondents to gather the information. The respondents are open to give their opinion on each item to see the understanding of the question. This process took about 2 weeks to complete.

Then, a pilot study was conducted to identify consistency of the questions and an understanding of the respondents to the questionnaire. In this pilot test, the instrument is known as QWU_3. Pilot test are conducted at 4 higher institutions and involved 175 respondents. 175 respondents were involved in this pilot study to allow the running of proper statistical testing procedures. The numbers of respondents are determined using GPower software using effect size approach. A pilot study was conducted to identify consistency of the questions and an understanding of the respondents to the questionnaire. The data analyse use Structural Equation Modelling which is Partial Least Square (PLS-SEM) approach to test the research hypothesis and the website usability model. Data analyses are conducted using SPSS 18.0 and SmartPLS 2.0. Nowadays there are many studies in Information System (IS) using Structural Equations Modeling (SEM) to test the theoretical model development (Roberts & Grover, 2009). SEM is a second generation statistical analysis techniques to examine or analyze the structure of inter-relationships among multiple variables in a model.

DATA ANALYSIS AND RESULT DISCUSSION

After experts reviewed the instrument, 9 items out of 60 items need to be removed from the questionnaire instrument. Each item needs to fulfil 2 requirements to be considered as important to the construct and have universal agreement (Haynes, Richard, & Kubany, 1995). The first stage is, each item needs to have average value given by 5 experts at least 3.5 and above. Then each item needs 4 experts to marks at less 3 marks. When 4 experts give at least 3 marks for each item in the questionnaire, it can conclude that they agree the items are important (Hardesty & Bearden, 2004). The issues that are identified in this stage, 3 items are about trust in the content construct. Most of the experts did not agree that trust need to consider in evaluating of the website usability for higher education institution website. It is because the higher education website is trusted website and all the information in the website is valid. Oth-

er items that need to be removed are more about the wording of the sentences. The items that need to remove are EY4, EY5, AC4, N4, C1, C2, C3, C7 and ITU4.

At pre-test, 6 items need to be removed from the 51 items in the questionnaire instrument. In this session, the researchers have a new perspective about the questionnaire. The issues that arise are the student did not understand the meaning of a few words such as the word “sufficient”, “accomplish”, “navigate” and other more. So the researchers need to look at the sentence and using simple words. The feedback from the students, the instrument needs to have translation in Malay language to give more understanding about the questionnaire. Besides that, researchers also identify the a few items that have a some meaning in other item. All the information from the pre-test is important to have more validity and reliability in the instruments. In this phase, the items that need to remove are L1,AC6, N2,C5,C10 and ID4. The analyses from the pre-test, 45 items are remained. The questionnaire has been translated to the Malay language using experts in language to ensure that respondents have solid understanding of the questions. First the instrument translated to Bahasa Melayu by expert. Then other expert translates the instrument in Bahasa Melayu to English. The result shows that all the items and constructs are validity and reliability.

After pre-test, the questionnaire instrument was tested in pilot study with potential respondents. The questionnaire instrument and website usability model were validated using SmartPLS software. To assess convergence validity for reflective measurement model there are three item that are factor loadings, average variance extracted (AVE) and composite reliability (CR). The recommended values for loading are set at > 0.7 , the AVE should be > 0.5 (Fornell & Larcker, 1981) and CR should be > 0.7 (Gefen, Straub, & Boudreau, 2000). Based on the result, most of items have more than 0.7 for factor loading. All construct have value of AVE are more than 0.5. Most of the construct have value between 0.587 and 0.783. The values of CR are between 0.876 and 0.926. The results shows that all constructs and indicators are significant and remain. After confirming the convergent validity, discriminant validity are tested. Discriminant validity is achieved (i) when the PLS indicators (items) load much higher on their own latent variable than on other variables, and (ii) when the square root of each construct's Average Variance Extracted (AVE) is larger than its correlations with other constructs (Fornell & Larcker, 1981). The result has shown that all the value in diagonal are greater than the values in the row and columns on the particular constructs. It show that the measures discriminant are distinct. Thereby, the questionnaire instrument validated to use for actual study.

CONCLUSION

This study of this research is underway and its result may be valuable for researcher that study on website usability to see a new dimension or measurable for evaluating website usability. The new enhancement website usability model also produced that give new perspective to researcher. The processes of development of questionnaire instrument that go through 3 phases have improved the instrument. A final instrument has 9 construct and 45 item of questionnaire. A few issues were tackled such as the element of trust in the context of Content attribute did not need in evaluating the website for higher education institution website and it also reflect to the government website. The content is trusted and valid to users. The culture and language also need to take a focus when develop questionnaire. It's better to have translated to another language for a focus group for having more understanding when answering the questionnaire. The feedback and comments from the experts in content validity by experts, pre-test with focus group and pilot test give the researchers to see the instruments in the width direction and focusing to the specific element to evaluate the website usability. It also gives confident to researchers to implement the instrument and distribute to actual study to produce a model for website usability.

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