

Prioritizing Usability Factors for Website Usability Improvement: A Case Study of Student Academic Information System at Brawijaya University

Niken Hendrakusma Wardani¹ and Apol Pribadi Subriadi¹

Abstract—The importance of usability can determine the success or failure of the web application. Conventional approaches of usability evaluation methods only consider the average score from usability assessment which represents the frequency of problems from users when using the website. Another approach to measure the impact of usability factors can be calculated using the method of Partial Least Square. The case study show that combining between this two approaches (average score of usability assessment and impact of usability factors) can be considered for decision makers in prioritizing factors usability.

Index Terms—Evaluation, prioritizing, usability, web application.

INTRODUCTION

Usability is defined by the International Standards Organization (ISO) as 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 [1]. In the more specific context of usability website refers to how easy it is to find, understand and use the information displayed on a Website [2]. Good usability can impact on improving the user's convenience, intensity of use and optimize the objective of website. Some companies went bankrupt because it does not consider the usability problems on its web applications [3].

Usability evaluation method is a procedure that is composed by a variety of well-defined activities to collect data usage related to the interaction between end users and software products, and then explain its contribution to achieving the degree of usability [4]. The importance of usability evaluation leads to several of usability evaluation method on web-based information system, for example ServQual, Web-based Service Quality, Usability Heuristics, ISO 9241-10 and UWIS. UWIS combines the dimensions of quality and usability assessment from another method. UWIS has seven dimensions and twenty-

four indicators to measure website usability namely reliability, assurance, responsiveness, integration of communication, navigation, controllability and quality of information [5].

Student Academic Information System at Brawijaya University web-based involves many users (students) who have different experience in using website technology. So it is necessary to do usability evaluation for reduce the failure of system usage and user complaints.

Conventional approaches of usability evaluation method using average score from respondent's assessment as the ranking for improvement websites. This approach ignores the presence or absence effect of usability factors on overall usability [6]. Although usability factor has a very low average score but these factors improvements not always have a significant impact. So it is necessary to predict what the most significant factor that affect the overall usability and the same time can explain the causal relationship between overall usability as dependent variable and the usability factors as independent variable.

Path coefficient, as output from Partial Least Square-Structural Equation Modeling (PLS-SEM), explains how strong the effect of one variable is on another variable. The weight of different path coefficient enables to rank their relative statistical importance [7]. Grouping respondents rating using three box methods represent the frequency of users who experience problems when operating the website. Both these measurements (path coefficient and three box method) be presented with a two-dimensional graph can give a clear picture of the sequence most important factors for the improvement of Student Academic Information System (SIAM) at Brawijaya University.

METHODOLGY

Research on usability is one of the researches in the area of Human Computer Interaction (HCI). The focus of this research is the development of a usability evaluation method in the stage of determining priority usability improvements using statistical analysis Partial Least Square and Three Box Method. Figure 1 illustrates the

¹Niken Hendrakusma Wardani¹ and Apol Pribadi Subriadi are with Departement of Physics Engineering, Faculty of Industrial Technology, Institut Teknologi Sepuluh Nopember, Surabaya, 60111, Indonesia. E-mail: niken.tif@gmail.com; apolpribadi@gmail.com.

framework for making prioritization of usability factors on website usability evaluation.

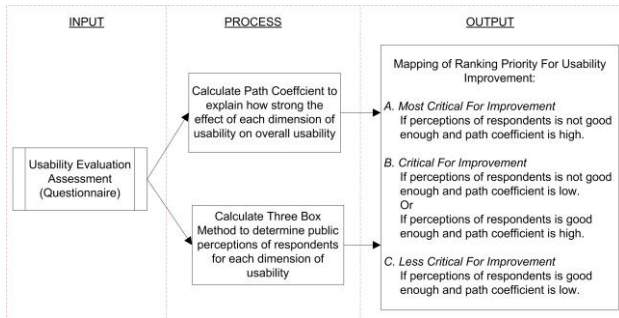


Figure 1. Framework For Making Prioritization.

Data input is a questionnaire of UWIS checklist as a result of usability evaluation assessment. Data input is processed using partial least square method to find the impact (“high” or “low”) of each dimension of usability on the overall usability. Besides that, the data is also processed using three box method to determine perceptions of respondents (“not good”, “good enough”, or “good”) for each dimension of usability. As shown in Figure 1 the mapping of ranking priority for usability improvement divided into three quadrants.

RESULT

In this study, 96 students were employed as the respondents of which 50% were female and 50% were male. Respondents are students of Brawijaya University who enrolled in the academic year of 2014/2015 and has attended the lecture for minimum one year so they have more experience for exploring the usage of SIAM. Questionnaire consisted of three tasks to do and 25 questions to answer. This questionnaire was adopted from UWIS assessment as usability evaluation methods. The survey result is processed using three box method to get the index number as frequency of usability problems and is predicted using partial least square method to get path coefficient as the impact of usability factors.

Table 1 shown the result of usability evaluation of website SIAM. There is seven dimensions that using for measuring website usability but three of them, which is integration of communication, navigation, and controllability, are not included in the order of priority because it has the p-value at the PLS-SEM analysis was not significant (p>0.05).

TABLE 1. DATA OUTPUT FOR MAKING PRIORITY

Dimension	Index Number	Perception of Respondents	Path Coefficient	Effect to Website Usability
Responsiveness	66.10	Good Enough	0.354	High
Assurance	65.30	Good Enough	0.281	High
Quality of Information	64.33	Good Enough	0.210	High
Reliability	66.27	Good Enough	0.142	Low
Controllability	69.00	Good Enough	0.068	Not Significant
Navigation	65.33	Good Enough	0.061	Not Significant
Integration of Communication	70.27	Good Enough	0.003	Not Significant

Reliability, assurance, responsiveness, and quality of information are the four factors that become priorities for website usability improvements. This factors mapping into three quadrants as shown in Figure 2. The critical factors of usability for improvement are responsiveness, assurance and quality of information that can be a consideration for decision maker to redesign website.

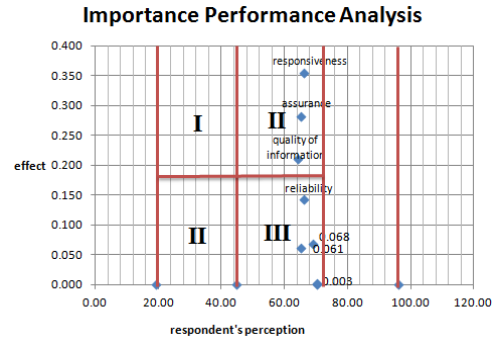


Figure 2. Mapping Of Ranking Priority For Usability Improvement.

CONCLUSION

Based on the results of the case study it can be concluded that the priority of website usability improvements can be made by considering the impact of each usability factor and the frequency of problems based on the perception of respondents.

REFERENCES

- [1] ISO 9241-11. (1998). Ergonomic requirements for office work with visual display terminals (VDTs), 28.
- [2] Keevil, B. (1998). Measuring the usability index of your web site. *Proceedings of the 16th Annual International Conference on Computer Documentation*, 271–277.
- [3] Becker, S. A., & Mottay, F. E. (2001). A global perspective on web site usability. *IEEE Software*, 18(February), 54–61.
- [4] Fernandez, A., Insfran, E., & Abrahão, S. (2011). Usability evaluation methods for the web: A systematic mapping study. *Information and Software Technology*, 53(8), 789–817.
- [5] Oztekin, A., Nikov, A., & Zaim, S. (2009). UWIS : An assessment methodology for usability of web-based information systems. *The Journal of Systems & Software*, 2038–2050.
- [6] Oztekin, A. (2011). A decision support system for usability evaluation of web-based information systems. *Expert Systems With Applications*, 38(3), 2110–2118.
- [7] Wong, K. K. (2013). Partial Least Squares Structural Equation Modeling (PLS-SEM) Techniques Using SmartPLS.