Usability evaluation of user interface of thesis title review system

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Abstract. Presentation of programs with user interface that can be accessed online through the website of course greatly provide user benefits. User can easily access the program they need. There are usability values that serve as a benchmark for the success of a user accessible program, ie efficiency, effectiveness, and convenience. These usability values also determine the development of the program for the better use. Therefore, on the review title thesis program that will be implemented in STT Dumai was measured usability evaluation. It aims to see which sides are not yet perfect and need to be improved to improve the performance and utilization of the program. Usability evaluation was measured by using smartPLS software. Database used was the result of respondent questionnaires that include questions about the experience when they used program. The result of a review of thesis title program implemented in STT Dumai has an efficiency value of 22.615, the effectiveness of 20.612, and satisfaction of 33.177.

1. Introduction
Thesis is obligatory by a student to finish their education in college. The filling process the title of the thesis which exists in STT Dumai is not relevant demanding to the repair and the speed of service process, because it has some weaknesses. Manual process requires a large amount of resources and the process will not going faster. Problems often faced by students in completing the thesis title review such as poor time management, ineffective utilization of time, low variation of the title of the thesis, the reading interest of students is very minimal to expand the insight and indiscipline is the cause of the delay of the thesis of the students. Thus, this research motivated to make thesis title review system. It also helps head of department and academic section avoid the redundancy of the final assignment of the students.

Review thesis title system that now exist in local intranet STT Dumai help students in the process of thesis proposal. The valuable thing in this process is to ease and smooth the process of thesis proposal in STT Dumai, in order to develop the software or application to have a better and can be useful optimally needs to be evaluated. Some previous research have made the proposal thesis system. Slamet, et al. [1]. Have made a proposal thesis system which didn’t have ability to detect the similar title with previous thesis that had been submitted. Thus, this research purposed to develop the proposal thesis system with this ability. This research aim is analyse usability that affects attitude revenue using (acceptability) the system to application. The benefits of the application of parameters measured according to the satisfaction of users against the application. A tendency the attitude of rejection or acceptance against application through the activities of the survey is expected to provide input for the improvement of this application at a later date. The presentation of the application of a user interface on
the overhead of a website is very conducive to provide facilities (usability) to the users [2]. This has resulted in current STT Dumai with efficient application, but less efficient interface design. Performance of a software can be measured by its usability, and one way to define quality of a software is by its “ease of use”. Software that is not easy to use by its user can be considered of lower quality.

The word "usability" has become a catch-phrase for products that work better for their users, but it is difficult to pin down just what people mean by it [3]. Usability means:

- A result, software that is usable
- A process, also called user-centered design, for creating usable software
- A set of techniques, such as contextual observation and usability testing, used to achieve that result or
- A philosophy of designing to meet user needs

The definition of usability is 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 [4]. This definition can be expanded, and made more comprehensive, by including three characteristics which must be met for the users of a product:

- Effectiveness defined as how well users attain their goals by using system and completeness it can be obtained in complete task. User assistance quality of interface can have a big influence on effectiveness. Optional of presentation influences the effectiveness of an interface, which is clearly understandable to the user. Users are able to do an activity without problems by using a more informative interface. An user’s language and appropriate to the task used in good interface terminology.
- Efficiency defined as resources issued to achieve accuracy and comprehensiveness of the purpose. View point of user is main point to define the interaction is not a single and granular. The Information of knowledge will be very efficient if it share little answer but it will describe users question.
- Satisfaction defined freedom from discomfort and positiveness on the use of products or size subjective how users feel about the use of system. That Impact of efficiency is design of navigation elements such as keyboard shortcuts, menus, links and other buttons. User just need less time and effort to use navigation and action choices if performance of well designed[5].

Usability is the extent to which a computer system enables users, in a given context of use, to achieve specified goals effectively and efficiently while promoting feelings of satisfaction. Usability Evaluation (UE) consists of methodologies for measuring the usability aspects of a system’s user interface (UI) and identifying specific problems [6]. A wide range of usability evaluation techniques have been proposed, and a subset of these is currently in common use [7]. Some evaluation techniques, such as formal user testing, can only be applied after the interface design or prototype has been implemented. Others, such as heuristic evaluation, can be applied in the early stages of design. Each technique has its own requirements, and generally different techniques uncover different usability problems [8]. This paper reviews the application with of the review thesis system in STT Dumai. This article also presents a discussion which can provide future directions in STT Dumai development with usability context.

2. Research Methodology

There are several steps in doing this research as shown in Figure 1. This is a general explanation of the steps in the research methodology.

- Study literature term weighting method.
  At this stage a literature study is conducted by collecting existing literature on studies that have relevance to the detection of word equality. This is done because the information system submission thesis title is designed to be able to detect the similarity of the title of the proposed thesis with a title that has been there before. So the newly submitted title will not be similar to the existing title, thus the research conducted by the student will be more developed.
- Examining the existing conditions in STT Dumai by observing activities based on the specific conditions that exist in the process of review thesis title manually.
- Creating a thesis title system review based on the manual thesis title review process that is running.
- Conducting a thesis title system review with target students, head of study program, and BAAK.
- Evaluation of the usability of the results of applying the thesis title system review by testing the usability side. Usability evaluation measured, i.e., effectiveness, efficiency, and satisfaction [2].
- Analysis of usability evaluation results by smartPLS [9] is based on effectiveness, efficiency, and satisfaction values to measure the success of system implementation.

**Figure 1.** Research Methodology.

In evaluating usability result of applying thesis title system review required research sample. The sample of research in question is the respondent which represents system users. The respondents were 58 students, head of study program, and 1 person form academic section. In one semester, there are at least 20-30 student who want to submit thesis proposal. The respondents are final year students who have submitted the title of thesis through the manual process. It is intended that the respondents selected as research samples are better able to measure the effectiveness, efficiency, and satisfaction when using the review thesis title system because previously been through the process of submitting the title thesis manually.

Respondents will be given a questionnaire to measure evaluation of usability. Questions given about experience when using the system. The assessment used is taken in terms of effectiveness, efficiency, and user comfort. Therefore, questionnaire questions given to the respondent about the user interface, the ease of using the service, the ease of following the process, and the ease of get information.

### 3. Result and Discussion

The first step is to prepare the questionnaire data in `.csv` file format to be used as an active data file. Table 1 shows the coefficients used in active data file. The coefficients are based on the question items in the questionnaire. Where construction used for usability evaluation is effectiveness, efficiency, and satisfaction (user satisfaction). The result is shown by Table 1.

**Table 1. Initial List of Construct and Item for Questionnaire Instrument**
### Construct | Code | Item | Loading Factor
--- | --- | --- | ---
**Efficiency** | EN1 | Upon opening the system did not wait too long to response back from the system | -0.835
| EN 2 | Easily get the required information from the system | 0.002
| EN 3 | The use of the system works more efficiently and quickly | 0.493
| EN 4 | Information needed more efficiency in finding data system menu content Available is not difficult in its use | 0.986
| EN 5 | | -0.155

**Effectiveness** | EF1 | The system used makes it easier to access data sought from anywhere | -0.205
| EF 2 | Guidelines in system usage are not difficult for users | 0.875
| EF 3 | Rapid System Response check for data search | -0.822
| EF 4 | The time required is not long for the results of the inputted data | -0.814
| EF 5 | This information is effective in helping user to get things done tasks and scenarios | 0.816

**Satisfaction** | ST1 | I feel comfortable using this site | 0.939
| ST 2 | The system interface user meets the expected usage | 0.259
| ST 3 | The output of the system as expected | 0.866
| ST 4 | user satisfied for the use of existing data system | 0.874

The second step is to create a model file. Where there are four latent variables used are, Effectiveness (EN), Efficiency (EF), Satisfaction (ST), and Usability. The three variables are EN < EF, and ST will connect (connect) to Usability. The file model can be seen in Figure 2.
The third step is calculated PLS algorithm. Then the fourth step, outer loading /loading factor results are reviewed. Coefficient with below-standard loading factor is less than the rule of thumb 0.70 [10] will be removed or deleted from the active data file then evaluated cronbach's Alpha and Path Coefficient Result. The results can be seen in Figure 3.

The Cronbach Alpha score was evaluated, where the standard of measurement model relativity was good, i.e., more than the rule of thumb 0.60 [11]. Thus, it can be concluded that the measurement model of all variables have good reliability. The rule of thumb from the support of a research hypothesis is if the statistical T value is more than 1.64 (two-tailed) or 1.96 (one-tailed) and the probability value (p-value) is less than 0.05 or 5%. From the above coefficient path can see that the T statistic value for effectiveness, efficiency, and satisfaction is more than 1.64 (two-tailed) or 1.96 (one-tailed) and probability value (p-value) less than 0.05 or 5%. This shows that the three constructs affect the usability value. The order of construction of the largest statistical T value to the small can be seen in Table 2.
Table 2. Construction and T statistic value

| Construction          | T statistic |
|----------------------|-------------|
| Effectiveness (EF)   | 20.612      |
| Efficiency (EN)      | 22.615      |
| Satisfaction (ST)    | 33.177      |

4. Conclusion

The importance of the process is to ease and smooth in filing their thesis title student at STT Dumai, therefore evaluation is necessary in order to develop products or application to better system and can be useful optimally. This research was done to analyse usability affecting the user revenue (acceptability) system of application. Using 60 respondent, using regression analysis double by 3 parameter uses smartPLS with the results are 20.612 the efficiency, the effectiveness of 22.615 and satisfaction of 33.177. The rejection or accept of respondents reaction to application through the survey expected to inform the application improvement. The presentation of application a user interface on a website is very conducive to provide facilities (usability) to the users.

References

[1] Billah S A and Hariadi S 2010 Rancang Bangun Aplikasi Sistem Sidang Skripsi Menggunakan Metode Object Oriented Jurnal Ilmu computer dan Teknologi Informasi Universitas Islam Negeri (UIN) Maulana Malik Ibrahim Malang 4.
[2] Albers M and Kim L 2002 Information Design For The Small-Screen Interface: An Overview of Web Design Issues For Personal Digital Assistants Technical Communication pp 45-60.
[3] International Organization for Standardization 1998 ISO 9241-11 1998 Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs)-Part 11 Guidance on Usability (International Organization for Standardization)
[4] Nayebi F, Desharnais JM and Abran A 2012 The state of the art of mobile application usability evaluation (Canada: In Electrical & Comp. Engineering (CCECE), 2012 25th IEEE) pp 1-4.
[5] Nielsen J 1990 Heuristic Evaluation of User Interface (Denmark:CHI’90 Proc.) pp 25-62.
[6] Jeffries R, Miller J R, Wharton C and Uyeda K 1991 User Interface Evaluation in the Real World: A Comparison of Four Techniques Proc. of the SIGCHI Conf. on Human factors in computing systems, ACM pp 119-124.
[7] Ivory M and Hearst M 2001 The State of the Art in Automating Usability Evaluation of User Interfaces (Berkeley:ACM Computing Surveys) 33 pp 470–516.
[8] Benbunan R 2001 Using Protocol Analysis to Evaluate The Usability Of A Commercial Web Site (Information & management) 39(2) pp 151-163
[9] Halawi L and McCarthy R 2008 Measuring Students Perceptions Of Blackboard Using The Technology Acceptance Model: A PLS Approach (America:Issues in Information Systems) 9 p 95.
[10] Chin WW 1998 The partial least squares approach to structural equation modelling Modern Methods For Business Research (New Jersey: Lawrence Erlbaum Associates Publiser) pp 295-336.
[11] Horrocks S, Anderson E and Salisbury C 2002 Systematic Review of Whether Nurse Practitioners Working in Primary Care Can Provide Equivalent Care to Doctors BMJ 324(7341) pp 819-823.