HEURISTIC EVALUATION ON PERPUSTAKAAN SULTANAH BAHIYAH (PSB) WEBSITE

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ABSTRACT

Heuristic evaluation which is a method of asking expert to get feedback about product usability was conducted on Perpustakaan Sultanah Bahiyah (PSB), Universiti Utara Malaysia (UUM) website. Five evaluators were identified among lecturers from the Faculty of Information Technology to uncover the usability problems of the website based on Nielsen’s ten Usability Heuristics. The objective was to determine usability problems of the new PSB website. As the evaluators looked through the website, they gave their positive and negative comments. However, only negative comments are highlighted in this paper. A few suggestions were also given. The findings of this research were categorized according to the ten principles.

INTRODUCTION

Library website is one of important web-based applications for most academic institutions. Most universities have their own library website including Universiti Utara Malaysia (UUM). Various online databases are accessible through the UUM library’s website. Links and the latest periodicals are also provided. In addition, digitized thesis, examination papers, and seminars, proceeding, workshop papers presented and attended by university staff and students are also available online. Figure 1 shows the homepage of UUM Perpustakaan Sultanah Bahiyah (PSB) website.

Since its implementation, few comments and complaints have been voiced by end users who are dissatisfied with some aspects of the website. A preliminary survey was conducted among Human Computer Interaction (HCI) lecturers of Faculty of Information Technology (FTM). Results showed that the PSB website had some usability flaws. To further identify the flaws, a heuristic evaluation was carried out.
OBJECTIVE
The objective of this research is to determine usability problems of the new PSB website using heuristic evaluation.

SCOPE
This research is limited to certain respondents and application:

Respondents
The respondents were chosen among the usability experts of Information Technology (IT) lecturers at UUM. The five experts were chosen because of their academic qualification, research and teaching experiences in usability field. Furthermore, the fact that they are local expertise makes them easier to participate in this study. In addition, they are UUM staff who want to give valuable contribution in improving the PSB website.

Application
The PSB new website that was first introduced in November 2004.

SIGNIFICANCE AND CONTRIBUTION
Ten heuristics principles by Nielsen were applied in evaluating PSB website in order to identify major usability flaws. The usability problems and suggestions identified could be used in improving interface design of PSB website so that the interface design will be usable.

LIMITATIONS
This research identified usability problems based only on Nielsen’s ten usability principles. Principles as suggested by other researchers were not considered.

USABILITY
This research focused on identifying usability problems of the new PSB website. Initially, the term usability was intended to replace the word “user friendly”. Until today, there are many definitions of usability. For instance, usability as defined by ISO9241 is “the effectiveness, efficiency, and satisfaction with which specified users achieve specified goals in particular environments”. In addition, Bevan et al. (1991) also provide one good definition of usability when they define it as the degree to which a computer system is easy to learn and effective to use. Nonetheless, this easiness depends on who the user is and what the task is.

According to Nielsen (1993), there are five usability attributes:

- **Learnability**: The system should be easy to learn so that the user can rapidly start getting some work done with the system.
- **Efficiency**: The system should be efficient to use, so that once the user has learned the system, a high level of productivity is possible.
- **Memorability**: The system should be easy to remember, so that the casual user is able to return to the system after some period of not having used it, without having to learn everything all over again.
- **Errors**: The system should have a low error rate, so that users make few errors during the use of the system, and so that if they do make errors they can easily recover from them. Further, catastrophic errors must not occur.
- **Satisfaction**: The system should be pleasant to use, so that users are subjectively satisfied when using it; they like it.

In general, usability measures how usable something is. As stated by Bevan, Kirakowski, and Maissel (1991) usability could be measured on many aspects including how the user interacts with the product, with particular emphasis on either their ease-of-use, or in the aspect of acceptability regardless of whether the product will be used in the real world or not.

Usability problems can be located in four different ways: at a single location in the interface, at two or more locations that have to be compared to find the problem, as a problem with the overall structure of the interface, and finally as something that ought to be included in the interface but is currently missing (Nielsen, n.d.).
Although usability is the most important aspect of website, it is often the most neglected (Nielsen, 2001). Usability determines the quality of the website (Brajnik, 2000), and to ensure this quality, usability evaluation must be done either by usability inspection or user testing (Brajnik, 2000). For this research, usability inspection method was chosen because it examine usability-related aspects of a user interface.

HEURISTIC EVALUATION
Heuristic evaluation is a method of asking expert to get feedback about product usability. According to Nielsen, heuristic evaluation is one of discount usability methods because it is cheap and effective (Barnum, 2002). It involves having a few evaluators evaluate the interface and judge its abidance with recognized usability principles.

The goal of heuristic evaluation is to identify usability problems so that they can be solved during iterative design process. This evaluation is popular in web development cycles because it saves money, time, and expertise. For example, Nielsen suggests three to five evaluators are sufficient to find different usability problems. Danino (2001) claims that this evaluation is known to find more than 90% of usability problems if three to five experts perform it. It can be done by people without or with little usability expertise, but Nielsen (1993) recommends using usability specialists as the evaluators.

In this evaluation, individual evaluator inspects the interface alone to ensure independent and unbiased evaluation from each evaluator. Then, they will discuss and combine their findings as written report or verbal comments.

Usually, a session of this evaluation will take one to two hours for each evaluator. They must go through the interface at least twice, once just to get familiar with the interface. Then, examine the interface by comparing it with recognized heuristics principle.

According to Barnum (2002), a set of heuristics can contain several hundred items but a popular model developed by Nielsen (in Nielsen and Mack 30) contains only ten principles.

The output of heuristic evaluation method is a list of usability problems of the interface regarding to the usability principles that were breached by the design from the evaluators' perspectives. Besides, the evaluators must give reasons why they do not like the interface concerning the heuristics. According to Nielsen (n.d), “the evaluators should try to be as specific as possible and should list each usability problem separately.”

METHODOLOGY
This research involves three main activities such as information gathering, interface evaluating, and data analyzing. The objective was achieved in the last two stages.

INFORMATION GATHERING
Products’ usability can be evaluated using two techniques, which are getting feedback from the users and the experts. Interviews and questionnaires are two methods of getting feedback from users and three evaluation methods of asking expert such as heuristic evaluation, expert review, and pluralistic walkthrough were considered. Related sources and information regarding heuristic evaluation has been gathered for this research.

However, in order to evaluate the PSB website, heuristic evaluation method was chosen. This is because, as stated by Danino (2001), “heuristic evaluation is a discount method for quick, cheap, and easy evaluation of the user interface.”

INTERFACE EVALUATION
First, five evaluators were identified among Faculty of Information Technology lecturers. Nielsen (2000) says, “the best results come from testing no more than five users and running as many small tests as you can afford”. According to him, different people find different usability problems in many heuristic evaluation projects. Nielsen recommends using three to five evaluators because one person will never be able to find all the usability problems in an interface.
Five evaluators were chosen based on their academic qualification, research and teaching experiences in usability field. All evaluators were called by telephone to make appointments that had been set according to their free time. The tests were held from 15 December 2004 until 22 December 2004 at each evaluator’s office. Equipment and materials involved were ten heuristics by Jakob Nielsen, tape recorder, and note pad. Time taken to complete each test session was approximately one and half-hours.

“In principle, the evaluators decide on their own how they want to proceed with evaluating the interface” (Nielsen, n.d). He also recommends that the evaluators should go through the interface at least twice. During our test session, each evaluator reviewed the PSB website interface base on the heuristic evaluation checklist once. As the evaluator looked through the website, he/she gave the comments. Other evaluators repeated the similar process.

DATA ANALYSIS
After all the evaluation sessions, the comments gathered were compiled to remove any duplicated issues.

FEEDBACK AND SUGGESTIONS
The feedbacks are categorized according to each of the ten heuristics as in Table 1. Although some experts agreed that the website was designed to show the visibility of the system status, there are also some experts who believed otherwise. In addition, experts also agreed that the website was not being designed according to some of the ten heuristics such as visibility of system status, match between system and the real world, consistency and standards, and error prevention. For example, the website did not have site map thus making it difficult for users to understand the whole site structure. This problem violated the first principle. Therefore, the experts suggested that a site map should be made available.

In addition, although “Announcement”, “Features”, “Search”, and “QuickLinks” were designed as responsive buttons, they are actually not. This problem violated the second principle. The experts misunderstood them as buttons that are clickable. Thus, they suggested changing the buttons into appropriate appearance.

Additionally, there was no pull down menu for “Library Catalog” as compared to other menus like “Electronic Resources” and “Electronic Forms”. This has violated the fourth principle. The experts expected to get pull down menu and thus wasted their time waiting. They, thus, suggested creating two submenus namely “e-Quip” and “WebOPAC”, under the “Library Catalog” menu.

Also, search engine was not functioning as expected. There were three choices of search engines, namely, “Our Website”, “UUM Website”, and “Google” but searching is redirected to Google search engine only. This violated the fifth principle. Thus, the experts suggested creating a functioning PSB and UUM search engines or using Google search only.
### Table 1: Summary of Usability Problems Identified Using Heuristics and Suggestions

<table>
<thead>
<tr>
<th>No.</th>
<th>Heuristics</th>
<th>Usability Problems</th>
<th>Suggestions</th>
</tr>
</thead>
</table>
| 1.  | Visibility of system status             | ▪ No site map.  
▪ Miscellaneous left menu – download status is unavailable (Refer to Appendix A-7).  
▪ Placement of pop up left menu is inconsistent (Refer to Appendix A-3).                                                                 | ▪ Create site map  
▪ Miscellaneous left menu – provide download status for example estimated downloading time and percentage downloaded.  
▪ Pop up left menu should appear parallel.                                                                 |
| 2.  | Match between system and the real world | ▪ Ask Librarian – confusing labelling (Refer to Appendix A-2).  
▪ Tooltip and label should not be the same (Refer to Appendix A-12).  
▪ “Announcement”, “Features”, “Search”, and “QuickLinks” look like responsive buttons but they are not (Refer to Appendix A-4).  
▪ Search – label of “UUM Website” in “within” field is confusing (Refer to Appendix A-15).  
▪ Choice of words for left menu is not suitable. E.g “UUM links” and “useful links” (Refer to Appendix A-4). | ▪ “Ask Librarian” – change it to “contactUs”  
▪ Tooltip should be meaningful and summarize the actual functions.  
▪ Change appearance of “Announcement”, “Features”, “Search”, and “QuickLinks” labels in home page.  
▪ Search – label of “UUM Website” in “within” field is confusing  
▪ Use suitable words for left menus. E.g UUM and Others.                                                                 |
| 3.  | User control and freedom                | ▪ Best view message is displayed – force user to use particular browsers (Refer to Appendix A-4).                                                                                                           | ▪ Web page should be made available to lower version of browsers (not all users use current versions).                                                                                                           |
| 4.  | Consistency and standards               | ▪ Date formatting is inconsistent – MMDDYY (top), DDMMYY (bottom) (Refer to Appendix A-5).  
▪ No pull down menu for “Library Catalog”.  
▪ “Vice Cancelor” link displays in content area but other links in separate windows (Refer to Appendix A-3).  
▪ Inconsistent labelling of “InHouse Digital Collection” (Refer to Appendix A-13).  
  ▪ Under features – digital  
  ▪ Under electronic resources – InHouse Digital Collection.  
▪ Mix of language (Malay and English) in “Who’s Who” (Refer to Appendix A-8).  
▪ Query results in “WebOPAC” - ascending and descending arrow for year are inconsistently placed. | ▪ Standardize date formatting.  
▪ Create two submenus, which are “e-Quip” and “WebOPAC”, under “Library Catalog”.  
▪ Display “Vice Cancelor” link in new window.  
▪ Choose one label for “InHouse Digital Collection” and “Digital”.  
▪ Use one language in “Who’s Who” section.  
▪ “WebOPAC” - ascending and descending arrow for year should be put after it.                                                                 |
<table>
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</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>Error prevention</td>
<td>▪ There is link to old website – confusing (Refer to Appendix A-8).</td>
<td>▪ Remove old website link.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Incorrect links – NST, AltaVista (Refer to Appendix A-17).</td>
<td>▪ Correct link to NST and AltaVista.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Scroll and animation in one display – “Digital”: “INFO” (Refer to Appendix A-11).</td>
<td>▪ Remove either one style – animation or scrolling text in “Digital Information”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ “InHouse Digital Collection” – label info is misunderstood as hyperlink because it is underlined (Refer to Appendix A-11).</td>
<td>▪ “InHouse Digital Collection” – remove the underline for label info.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Search engine is not functioning as expected. It is redirected to Google (Refer to Appendix A-6).</td>
<td>▪ Create a functioning PSB search engine or change label to Google search.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Query results in “WebOPAC” – all buttons are enable even there is no selection of record (Refer to Appendix A-16).</td>
<td>▪ Query results in “WebOPAC” – enable only ‘Back’ and ‘Select all’ buttons if there is no selection yet.</td>
</tr>
<tr>
<td>6.</td>
<td>Recognition rather than recall</td>
<td>▪ Color-coding in “InHouse Digital Collection” and homepage is inconsistent (Refer to Appendix A-11).</td>
<td>▪ Use the same color-coding scheme throughout the website.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Inactive menu is not grayed out, e.g “HOME” button in homepage (Refer to Appendix A-1).</td>
<td>▪ “HOME” button should be disabled.</td>
</tr>
<tr>
<td>7.</td>
<td>Flexibility and efficiency of use</td>
<td>▪ No major usability problem is identified.</td>
<td>Nil.</td>
</tr>
<tr>
<td>8.</td>
<td>Aesthetic and minimalist design</td>
<td>▪ No different title for each screen (Refer to Appendix A-9).</td>
<td>▪ Have different title for each screen that highlight about the screen content</td>
</tr>
<tr>
<td>9.</td>
<td>Help users recognize, diagnose, and recover from errors</td>
<td>▪ Error message does not indicate action to recover from error – e.g patron login in “eQUIP”.</td>
<td>▪ Error message should tell user how to recover from error.</td>
</tr>
<tr>
<td>10.</td>
<td>Help and documentation</td>
<td>▪ No major usability problem is identified.</td>
<td>Nil.</td>
</tr>
</tbody>
</table>
For example, PSB website was designed using frozen layout. Frozen pages were cut off in small windows, and they displayed huge amount of wasted white space in large windows (Nielsen & Tahir, 2002) as shown in Figure 2. This is not good because it forces user to use certain screen resolution. The experts suggested using a liquid layout that automatically adapted to the size of the user’s browser window.

![Figure 2: a) Wasted White Space in High Resolution Window. b) Page Was Cut of in Low Resolution Window.](image)

According to one expert, the information in “Who’s Who” reveals too much staff information, which can be considered as breaching of privacy and security. He suggested that the staff information should be from PSB own database instead of UUM system.

Another expert commented on misuse of capital letter for left menu, as shown in Figure 3, which is against the Internet ethics. Use of sentence case to follow guideline and ethics is suggested by her. Besides the left menu, the PSB web designer should also consider the three top menus.
CONSTRAINTS AND CONCLUSION
Throughout the study, the website interface was updated a few times thus causing distraction in terms of researchers’ understanding of the interface and preparation of the evaluation session. In addition, unstable servers, and low network performance during the study also added problems to the processes. This research was conducted to identify usability problems using heuristic evaluation technique. Based on the findings, the PSB website has many usability flaws. Even though, in this research, only Nielsen’s ten usability heuristics had been used the experts found only eight principles were violated.

REFERENCES