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Abstract

Manuscripts are among the special collections of most libraries. The collection of manuscripts of the International Islamic University Malaysia (IIUM) library can be retrieved from the Digital Manuscript interface of the IIUM Library website. User evaluation of the interface is much needed to enable library administration know users' experience while interacting with the interface.

This study attempts to evaluate the effectiveness, efficiency and user satisfaction with the IIUM Digital Manuscript interface among the library users, based on the usability metrics established by the American National Standards Institute (ANSI). Questionnaires were administered to gather information about users' background and their satisfaction with the use of the interface. In addition, each respondent was given eight tasks that have been specifically designed to measure their ability to navigate within the digital manuscript interface of the library. Findings indicate that despite some of the shortcomings observed with the interface design, respondents were able to complete the tasks assigned, though at different completion duration. They were also satisfied with the overall design of the interface. Comments and recommendations given by the respondents were as well reported.

Keywords

Manuscript, digital library, interface design, usability study, user experience

Introduction

'Manuscript' is from the Latin phrase *codex manu scriptus*. Explicitly, manuscripts are works of any kind (text, inscription, music score, map, etc.) written entirely by hand. A *medieval manuscript* is one written in Europe prior to the invention of printing from movable type in about 1450. It also refers to the handwritten or typescript copy of an author's work as submitted for publication before printing. Given the recent development and adoption of Information and Communications Technology (ICT) in almost all sectors of the economy, libraries also need to implement the use of ICTs to enhance access to their resources by users. One of such implication is the digitization of library collections. Manuscripts have been identified as rare and precious collections that are normally prioritized in most digitization projects in libraries around the world. Digitizing manuscripts collection has been found to promote greater use of manuscripts and to safeguard the posterity of the rare materials.

The Library of the International Islamic University Malaysia (IIUM) has an appreciable collection of rare manuscripts. In line with technological development, the library has since undertaken digitization projects for manuscripts. The digital manuscripts collection can be accessed from the library interface, available at: *http://www.iium.edu.my/lib.*

Literature Review

Usability evaluation in libraries

There have been tremendous amounts of works carried out on usability evaluation in the past. According to Pearrow (2007), usability is a broad discipline of applying sound scientific observation, measurement, and design principles to the creation and maintenance of Web sites to bring about greater ease of use, ease of learnability*,* amount of usefulness, and least amount of discomfort for the humans who have to use it. He adds that usability evaluation is not about accessibility, marketing research, or "crafting" the user experience.

A study conducted by Yushiana and Widyawati (2007) evaluated the design of OPAC's interface by three of the ten heuristic evaluation proposed by Nielsen (i.e. visibility of the interface status, match between interface and the real world, and aesthetic and minimalist design). The study identified some weaknesses of the interface in terms of proper messaging system to inform users on the system's status during delays. For menu instructions, it was found that prompt and error messages did not appear at the same place on each menu screen. Also, the terms used in the dialog box are not user-friendly, the interface did not offer clear activation cues or feedback on when to start an action, the jargons used are not friendly, and menu title is not brief. They suggested five areas of the interface that need improvement: (a) to provide a Graphical User Interface (GUI) menu with clear activation to make it obvious to the users on when the next operation can be started; (b) to ensure that menu instructions prompts and error messages appear in the same place(s) on each menu; (c) to ensure a clear indication is provided to keep users informed on the interface delay; (d) to ensure dialog boxes are user friendly by using jargons familiar to the users instead of computer jargons, and; (e) to ensure terms used are simple, precise and concise.

Beier and Vaughan (2003) have described a framework for interface design guidelines that attempts to extend some of the user interface principles of non-HTML interfaces (e.g. Java) to HTML-based Web sites. In their study, they suggest the Bull's Eye framework for user interface guidelines which consists of five layers i.e. "Overarching Features and Principles" representing site-wide guidelines such as use of natural language, minimalism, colour palettes and other aesthetic, and object versus action orientation; "Combination of Page Flows to Create Interaction Patterns"; Page Flows'; "Page Templates"; and "Components" which represents discrete elements such as buttons, text fields, text, and simple combinations of these elements.

Blandford, Keith, Connell and Edwards (2004) opined that usability evaluation has two types, i.e. empirical and analytical. Empirical involves evaluation by the users whereas analytical involves experts' assessment using established theories and methods. According to Pearrow (2007), *usability metrics* are quantitative features of use that are used in statistical techniques to produce an overall picture of the usability of a site. They are almost exclusively used in conjunction with classical usability testing.

According to Nielsen (2001), the four most common metrics of usability are success rate, total time a task requires, error rate, and users' subjective satisfaction. A success rate is defined by a user accomplishing a usability task under any constraints placed on the task (e.g. goal state, time limit, or total number of clicks required).The success rate is the percentage of times that users can accomplish a task. Total time a task requires is measured in seconds (and minutes if needed). Error rate is the percentage of times users fail to accomplish a task. Users' subjective satisfaction is how the user feels about the task and his or her performance; which is usually scored on a scale of one to five or one to seven. These four metrics are task-centric, which means that they are applied to specific tasks by specific users. Nielsen (2001) describes a method for finding the average of a given metric for tasks, which is to use the geometric mean rather than the common arithmetic mean. During the task, the usability researcher would note the total time completion that the task took and whether the task was considered a success. It might be valuable to record the time taken even if one or more measures exceed the predetermined thresholds because if the majority of users run over the thresholds but do accomplish the task, and their subjective experience with the task is positive, the thresholds might be unnecessarily low.

Nonetheless, a standardized format for usability study reports has been established by the American National Standards Institute (ANSI). This document is known by its publication number, ANSI NCITS 354-2001, and also by the slightly less ominous acronym CIF (Common Industry Format). The CIF spells out the format for usability reports but does not provide any information on how tests should be administered. In spite that, the CIF does define usability itself as being measured by three types of metrics (ANSI, 2001): Metrics for effectiveness, metrics for efficiency, and metrics for satisfaction. The CIF goes on to spell out several dimensions of each sort of metric. For an example, effectiveness is determined to be a function of task completion rates, number of errors, and number of "assists" (cases in which the test moderator helps the participant with a subtask so that the trials continue).

Rhodes (2000) spells out factors for each of the three sorts of metrics as was also reommended by Mayhew (1992), Landauer and Nielson (1993), and Whiteside, Bennett, and Holtzblatt (1988). The details are presented in the Table 1 below:

Table 1: Effectiveness, Efficiency, and Satisfaction Metrics

Effectiveness	Percent of tasks completed Ratio of successes to failures Workload Number of features or commands used
Efficiency	Time to complete a task Time to learn Time spent on errors Percent of number of errors Frequency of help or documentation use Number of repetition or failed commands
Satisfaction	Rating scale for usefulness of the product or service Rating scale for satisfaction with functions and features Number of times user expresses frustration or anger Rating scale for user versus technological control of task Perception that the technology supports tasks as needed by the user

Any combination of these measures might be used in a usability study. The selection of measures depends entirely upon the goals of a particular study, the characteristics of the users, the specific sorts of tasks, and context-dependent features (ANSI, 2001; Dumas and Redish, 1999).

The study

This study focuses on the usability evaluation of the IIUM library Digital Manuscript service, using the three usability metrics established by ANSI, the American National Standards Institute in its publication number, ANSI NCITS 354-2001. i.e. effectiveness, efficiency and satisfaction Two instruments were used to gather data for this study:

1. **Questionnaire** consisting of respondents' background and satisfaction measured by respondents after using the IIUM Library manuscript interface.

2. **Task list** consisting of eight tasks to measure effectiveness and efficiency. Effectiveness is measured by tasks completion without assistance, and efficiency is measured by time taken for completing the tasks.

    The 8 tasks given to participants are:

    a) *Locate the IIUM Library Online Digital Manuscript interface.*

    b) *Locate the records of ISLAM using **ANY SEARCH** box.*

    c) *Locate the records of ISLAM using **SUBJECT search** box.*

    d) *Locate the record for a manuscript using **Ref. Code** search box.*

e) *Locate the record for a manuscript using **Language** search box.*

f) *Locate the record for a manuscript using **Author/Creator** search box.*

g) *Locate the record for a manuscript using **Collection** search box.*

h) *Locate the record for a manuscript using **Contributor** search box.*

Findings

Respondents' background

Thirty-six (36) students agreed to participate in this study, in which 18(50%) were undergraduate and 18 (50%) were postgraduate. When asked about their perceived IT competency, 26 (72%) considered themselves as 'intermediate', 9 (25%) indicated 'advanced', while 1 (3%) was a 'novice'.

Site experience

When asked about their familiarity with the IIUM Library's online digital manuscript interface, most of them stated that they were not familiar at all with the interface (41.7%), 19.4% indicated 'little familiar' and the same goes for 'moderately familiar' (19.4%), 16.7% (6) are 'familiar', and only 1 (2.8%) person is 'very familiar' with the interface.

Ability to complete task (Effectiveness)

Table 1 below presents the varying degree of respondents' ability in completing the 8 tasks given to them.

Table 1. Task Completion

	Locate the interface	ANY SEARCH	SUBJECT search	CALL NO. search	LANGUAGE search	AUTHOR search	COLLECTION search	CONTRIBUTOR search
	Task1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Task 8
No	44%	39%	53%	61%	44%	36%	22%	33%
Yes	56%	61%	47%	39%	56%	64%	78%	66%

a) *Task 1-Locate the IIUM Library's Online Digital Manuscript interface.*

Twenty respondents (56%) knew how to go to the interface from the IIUM Library's website while 44% (16) failed to locate where the interface is. From the observation, users could not locate the manuscript collections interface because they could not find the link to the interface from the IIUM Library's website. However, all users were able to locate the interface after being assisted.

b) Task 2 -Locate the records of ISLAM using ANY SEARCH box.

This task was to test whether the users know how to use the basic search (it is referred to as ANY SEARCH on the manuscript interface). The results indicate that 61% (22) of the respondents completed the task without assistance, while about 39% (14) were unable to complete the task without assistance. Most of those who failed to complete the task relate the problem to the use of variant keywords such as *Islamic banking, Islamic finance, Islamic law, or Islamic.*

c) Task 3-Locate the records of ISLAM using SUBJECT search box.

This task was designed to test whether users are aware of the subject search feature. It was observed that 53% (19) of the respondents could not complete the task without assistance but the other 47% (17) completed the task without assistance. Most of the subjects complained that they could not see the Subject Search box because they had to scroll down the interface.

d) Task 4-Locate the record for a manuscript using Ref. Code search box.
 (referred to as Ref. Code on the interface) search box. It was found that 61% could not complete the task but the remaining 39% were able to complete the task without assistance. The most common errors that users made were spelling/typographical errors mainly due to the long call number.

e) Task 5-Locate the record for a manuscript using Language search box.
More than half of the students (56%) know how to use the language search box while the other 44% failed to do so. Most of them failed to locate where the Language Search box is.

f) Task 6-Locate the record for a manuscript using Author/Creator search box.
Results indicate that 64% (23) students completed the task successfully, and only 36% could not complete the task without assistance. Most students commented that they were not sure or confused with the term *Creator/Author*. As such, they were not sure of what to type in the particular search box.

g) *Task 7-Locate the record for a manuscript using Collection search box.*

This task determined whether the users were able to search by type of collection. Results show that 78% (28) respondents were able to complete the task, whereas 22% (8) could not complete the task without assistance.

h) *Task 8-Locate the record for a manuscript using Contributor search box.*

Results of this task show that 67% (24) students completed the task, and 33% did not complete the task without assistance. From the observation, this was because users were confused about the presence of both *Contributor Search* box and *Creator/Author Search* box, which to them was quite similar.

Task completion time (Efficiency)

For all the successfully completed tasks, the time taken were recorded and averaged. The Table 2 below shows the mean, median, and mode of the counted time (by seconds) for each task given.

Table 2: Time (in seconds) to complete tasks

	Locate the interface	ANY SEARCH	SUBJECT search	CALL NO. search	LANGUAGE search	AUTHOR search	COLLECTION search	CONTRIBUTOR search
	Task1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Task 8
Mean	25 sec	23 sec	23 sec	46 sec	27 sec	29 sec	19 sec	28 sec
Median	19 sec	14 sec	20 sec	40 sec	22 sec	24 sec	17 sec	22 sec
Mode	15 sec	6 sec	9 sec	56 sec	10 sec	25 sec	8 sec	17 sec

The highest average (mean) time taken to complete a task is 46 seconds for task 4 which is to find the title for a manuscript that has Ref. Code: e.g., ***msf Pococke 21 [160]***. From the users' feedbacks, they complained about the long call numbers adopted, and complained that the use of square bracket was confusing and led to typographical errors. For the other tasks, subjects were able to complete the tasks in less than 30 seconds.

Satisfaction with the interface

Subjects were asked to indicate their level of satisfaction with the interface design elements using the scale; 1=strongly dissatisfied; 2=dissatisfied; 3= moderately satisfied; 4= satisfied; 5= highly satisfied. The mean scores for the 10 statements posed to them are as follows:

1. *I am satisfied with the amount of information on the site.(mean=3.97)*
2. *I am satisfied with the use of colours on the site.(mean=3.88)*
3. *I am satisfied with the ability to move around the site without getting lost. (mean=3.72)*
4. *I am satisfied with the helpfulness and reliability of the site. (mean=3.91)*
5. *I am satisfied with the adequacy of information from the search site. (mean=3.86)*
6. *I am satisfied with the terminology used throughout the site.(mean=3.86)*
7. *I am satisfied with the results of the digitized manuscript The images are clear and sharp.(mean=3.97) .*
8. *I am satisfied with the use of white space. (mean=4.0)*
9. *I am satisfied with the time to load the result. (mean=4.3)Overall, I am satisfied with the site.(4.05)*

Overall, subjects were satisfied with the interface (mean= 4.05). They indicated the least satisfaction with 'movement' (mean=3.72).

Additional Comments from the respondents

The following are among the comments and recommendations directly quoted from the respondents:

1. *'Terminology used is confusing (such as "Identifier", "Author" and "Contributor" has similar intent)'.*
2. *'The site is user-friendly and very professional. Overall, it is good but there is always room for improvement.'*
3. *'Students are not familiar with this service. So, there should be a tutorial from the library.'*
4. *'They put the Creator before the Author and I can't find it because I am looking for the Author not for Creator. The colors used are not enough because there are only two colors.'*
5. *'It is hard to see the link for manuscript in the IIUM Library's website.'*
6. *'If possible IIUM Library should provide a link with another libraries' manuscript collection.'*

7. *'The terms used for Metadata Search are not user-friendly especially for those who are not from the Library Science background.'*

8. *'It is quite difficult to locate manuscript interface. Other than that, it is easy to use.'*

9. *'Confused between Creator and Contributor; and between Subject and Title.'*

10. *'Terminologies used for Creator/Author and Contributor are confusing.'*

11. *'Good and informative to all students and staffs to search manuscript in the IIUM Library's collection.'*

12. *'Being a first time user, it was a little bit confusing when trying to search based on Contributor. I think the Language search is not helping because some of the languages are not available in the collection i.e. Urdu and Malay.'*

13. *'The interface looks not so attractive because the colors used. It makes the interface dull, and the terminologies used in Metadata Search are quite difficult to understand.'*

14. *'Simple and quite okay. However, the link to Manuscript interface from IIUM Library website is not highlighted.'*

Conclusion

In general, the findings of the study indicated a very positive feedback toward the usability of the digital manuscript interface of IIUM library. Despite their lack of familiarity with the interface, subjects were able to complete the tasks, though at varying degree of success. With proper training on the how to use the database and how to navigate within the interface, it is expected that the level of satisfaction with the service can be further raised. Users had also shared some useful insights into their experience in interacting with the interface and provided recommendations to improve the interface. This only confirms their positive experience with the service and their indication of continuing using the service.

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