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Usability Evaluation of the Web Pages of the Islamic World Science Citation Center (ISC), Islamic Countries SCI database

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Abstract

The purpose of this study was to evaluate the web pages of Islamic World Science Citation Center (ISC), the Islamic Countries SCI using Nielsen`s Heuristic Principles and was performed during September 2012. Among Nielsen`s 10 usability heuristic principles, five were covered. Five professional evaluators were asked to evaluate the database using Nielsen`s five criteria. The total average of severity rating of database problem was calculated 1.008 which stated minor problems in overall look of the database. According to this study, strengths and weaknesses of the WebPages of Islamic Countries SCI of ISC database were discovered which might be used by beneficiary groups like database designers.

Keywords: usability, heuristic evaluation, user interface, web pages, Islamic World Science Citation Center, Islamic Countries SCI

Introduction

Today most universities have provided a wide access to databases to enable students and faculties meet their information needs.Database design, user interface, and structure are of great importance in the user-system interaction.Web pages of some databases might not meet users' expectations; they are hard to use, for instance, and the users face trouble working with them.Users leave a web site if a page of a site fails to act clearly and explicitly, if a website is hard to use, if its home page does not clearly state its goalsand does not specify what users can do on the given site, if users lose their position on the website, or if website does not

answer the key questions of the users.

Nielsen andLoranger (2006) have shown that in these situations, users even do not bother themselves to dig in through other subjects in the bottom of the page.

Launching a database is a costly process. The latest technologies have to be implemented to make the database able to meet the user's needs. Organizations must make sure that it is worthy to allocate a big budget on this issue. They need to trust the product and feel that it will fulfill their users' needs and that their users will face no difficulty while using it.

"Thus an efficient website is the one which provides quick and effective access to information. Creating a user-friendly website is similar to managing the referents toward the high quality information. An efficient website can take a long step toward training users to identify targeted and high-quality information and assists them in finding their needed information"(Zerehsaz& Fatahi, 2006). Accordingly, it is necessary to apply the standards and principles of usability for designing the websites, and websites should be continuously evaluated. Therefore, usability is of great importance in the successful performance of the site. Indeed, the quality of the user interface lies in its usability.

Islamic World Science Citation Database (ISC)

"Islamic World Science Citation Database (ISC) is a citation index established by the Iranian Ministry of Science, Research and Technology after it was approved by the Organization of the Islamic Conference. It only indexes journals from the Islamic world. It was announced in Baku, Azerbaijan during the Fourth Islamic Conference of the Ministers of Higher Education and Scientific Research held in October 2008. It is managed by the Islamic World Science Citation Center, located in Shiraz. In 2009, ISC partnered with Scopus that allows ISC's publications to be indexed in Scopus"("Islamic WorldScience Citation Center," 2011).It has published about 30 books and 13 journals. ISC databases provide access to current and retrospective bibliographic information and cite references found in Islamic countries scientific journals covering Engineering, Science, Agriculture, Medicine and Humanities` disciplines (Mehrad&Naseri, 2010).

This study explores the Islamic World Science Citation Center (ISC) status at September 2012 in terms of usability. It also specifies the possible strengths and weaknesses of the user interface of the web pages and can be effective in improving the interaction between user and database.Offering recommendations derived from the research findings, it also helps experts and designers to design their web pages with high usability.

Research Objectives

The purpose of this research was to discover the amount of compatibility of the web pages of Islamic Countries SCI database of Islamic World Science Citation Center (ISC) with the criteria derived from Nielsen's ten usability heuristics. The mentioned criteria include:

- Visibility of system status
- Consistency and standards
- Error prevention
- Aesthetic and minimalist design
- Help and documentation

In the current study, we were looking for these two questions :

1- How was the status of the database under study in relation to each one of the criteria discussed in this study, from the evaluators' point of view?

2- In the view of evaluators, how much was the severity rating of the existing problems in the user interface of the mentioned database?

Human-ComputerInteraction (HCI)

Software before being released to its intended users, undergoes a battery of tests to make sure there are no bugs and any application errors. However, the true test of the software is when the end-user uses it. There are situations where the end-user does not understand or gets confused on how to operate the software. (Bautista, 2010). Human-Computer Interaction, broadly speaking, addresses any human interaction with computers, as developers or as users, as individuals or as groups. (Fruhling, 2003).

In particular, HCI area deals with the design, evaluation, and application of interactive computing systems for human usage and study of the major phenomena surrounding them. Beyond this, HCI offers techniques, methods and guidelines to better and more "usable" design of the products (ibid)

Human-computerinteraction arises from sciences such as computer graphics, operating systems, human factors, ergonomics, industrial engineering, cognitive psychology, library and information sciences, social psychology, speech-language pathology, design, aesthetics, artificial intelligence and cognitive science(Hasanpour Moayeni, 2008).

User Interface

Given the diversity of computer environments, it seems that users are facing some troubles in the use of databases properly, since the role of librarians has been pale as mediators in their direct guidance. User interface, as a mediator between the databases and users, can be an appropriate alternative for human factors in the new environments (Azami & Fatahi, 2009). Since user interface has great subjective and objective impacts on users and makes them able to obtain a proper understanding of the databases, it is necessary to pay attention to its features while designing the webpage. A good user interface, results in the better understanding of users regarding their path in the database and it will have a considerable effect on their performance.In fact, in the retrieval process, the user interface is the only connective bridge that links the user with information retrieval systems(Alijani

&Dehghani, 2007).

According to YaminFirooz (2002) the significance of user interface is that it makes resources usable and makes the existing information accessible. It also shows the user the structure of the existing information in the website or database and how this information is related to each other. In fact, user interface conveys the thought and idea of its designer to the user. The given impact, is a factor that user obtains a proper understanding of the database and may utilize it properly. A good user interface result in the attraction of numerous users. It also reduces the users drop during their visit of the website.

Usability

Zerehsaz and Fattahi (2006) told that "usability means that user can make the maximum use of the amenities and facilities of the site for searching, retrieval, and displaying of information and in this way does not face serious problem while working with databases.

Usability is the ease of use and learnability of a human-made object. The object of use can be a software application, website, book, tool, machine, process, or anything a human interacts with (Usability, 2012).

Usability is a multidimensional concept that can be studied from different viewpoints. Different characteristics have been widely discussed in different texts to measure the usability.

As Buchanan and Salako (2009) state, "international standard organization (ISO) holds two definitions for usability: ISO 9126-1 puts stress on the understandability, learnability, operatability and attractiveness, while ISO 9241-11 specifieseffectiveness, efficiency and satisfaction". Among researchers, Nielsen (1993) notably proposed learnability, efficiency, memorability, errors and satisfaction. Effectiveness, efficiency, satisfaction, security and learnability are poses by Abran, Khelifi, andSuryn (2003) while Tsakonas and Papatheodorou (2008) consider learnability, ease of use, aesthetic appearance, navigation and terminology to be important. Nielsen (1993) has considered ten general criteria for the five properties mentioned as follows:

1. Visibility of system status

The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

2. Match between system and the real world

The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

3. User control and freedom

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended

dialogue. Support undo and redo.

4. Consistency and standards

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

5. Error prevention

Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.

6. Recognition rather than recall

Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

7. Flexibility and efficiency of use

Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

8. Aesthetic and minimalist design

Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

9. Help users recognize, diagnose, and recover from errors

Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

10. Help and documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

Jeng (2005) in a research has shown that the most widely cited definitions are the ones of ISO and Nielsen.

Oulanov and Pajarillo (2001) believe that usability evaluation has become an essential prerequisite in product design, development and acceptance.

To Nielsen (1993), heuristic evaluation is a usability engineering method for finding the usability problems in a user interface design so that they can be attended to as part of an iterative design process.

Research Background

Fattahi and Entezarian (2009) studied the fundamental problems of the user interface of

Regional Information Center for Science and Technology (RICeST) and Iranian Research Institute for Information Science and Technology (IranDoc) as well as the differences between the rate of expert and novice users' understanding, using the heuristic evaluation method and Nielsen's ten components. Findings revealed that the rate of compatibility between the user interface of the Iranian Research Institute for Information Science and Technology (IranDoc) site and its components is at a medium level and for the interface environment of the Regional Information Center for Science and Technology (RICeST) siteis a bit more than the medium level. Both databases suffered from basic problems in some components. Moreover, the results did not show a significant correlation between the factors of gender, age, educational area, amount of familiarity with searching techniques in the web, and the history and familiarity with the regional center's web site and research center's web site. However, a significant difference was observed between the amount of expert and novice users' understanding of the interface environment of databases under the study.

Mehrad and Zahedi (2007) also studied and compared the user interface of two internal host of the Regional Library for Science and Technology (Now renamed Regional Information Center for Science and Technology (RICeST) as well as Iranian Research Institute for Information Science and Technology (IranDoc), with four foreign host including Elsevier, Emerald, Ebsco, and Proquest.

Their study was conducted in a comparative survey method using the researcher-made checklist focusing five features (general features, search, retrieval, display and user friendliness). Results showed thatin domestic hosts, Regional Library for Science and Technology, and Iranian Research Institute for Information Science and Technology (IranDoc) and in international hosts, Ebsco, Proquest, Emerald and Elsevier had the highest features, respectively, concerning the five attributes under the study.

Abbaspour (2006) in his thesis evaluated the user interface of the databases of dissertations' abstract of IranDoc. In his study, five library and information professionals determined the fulfillment or not fulfillment of criteria and the severity rating of the found problems, based on Cherry, Williamson, Jones-Simmons, and Gu(1994) checklist.

Results revealed that in designing the user interface of the studied database, 35.63% of the necessary criteria had been observed. Criteria under the study included bibliographic information, operational control, search, access points, display screen, output control and user guide. According to the given checklist, bibliographic information with observing of 100% of the criteria had the highest conformity, and operational control with observing 10% of the criteria had the lowest conformity among all mentioned criteria. In addition, the highest and lowest estimated severity rating, in a ranking scale of zero to four, belonged to the access field with the mean of 3.71 and display field with the mean of 2.50. Results of the study emphasize the presence of some fundamental and catastrophic problems in the user interface of this database.

Oulanov (2008) in a study examined the Business administration students` perception of usability of the Business Source Premier database using the five criteria and method of SUMI (Software Usability Measurement Inventory).The results of the study showed that the given database was rated the highest in terms of efficiency. Some improvements might be necessary to increase the usefulness of the system. User effort scored lower than the others while affect, adaptability, control, measures of effectiveness, and retrieval features, were rated high. The overall performance of Business Source Premier was high and possible paths for improvement were likewise offered.

Yushiana and Widyawati (2007) in their heuristic evaluation of the usability of user interface of the OPAC of the MalaysiaInternational University Library, focused only on three factors including "system visibility", "match between system and the real world" and "Aesthetic and minimalist design". In order to implement the study, ten students of the communication and information technology were asked to collaborate and prior to the research implementation, necessary trainings were done concerning the interaction with the given website.Findings showed that the WebPAC interface conforms to at least 70 percent usability properties prescribed.

Manzari and Trindad-Christensen (2006) using a heuristic evaluation and using Nielsen checklist, addressed the usability of the web site of the library of Long Island university in New York, State of New Jersey, began with three faculty members. The results showed that the navigation ability, from one page to another, had been the biggest problem users had.Some users became confused due to the different layout of the pages,

Methodology

The present study has been performed in a heuristic evaluation method. Nielsen`s heuristic checklist was given to five professional evaluators like what Nielsen recommended in his method. The suggested Nielsen ranking scale, from zero to four, is as follows:

0 = I don't agree that this is a usability problem at all

1= Cosmetic problem only: need not be fixed unless extra time is available on project

2= Minor usability problem: fixing this should be given low priority

3= Major usability problem: important to fix, so should be given high priority

4= Usability catastrophe: imperative to fix this before product can be released(Nielsen, 1995).

The list of the extracted problems from the given websites, based on the mentioned rating scale was given to the evaluator. The main reason of choosing this method was high citation to Nielsen`s heuristic approach at usability studies.

Nielsen(1993) in his book states that by applying five evaluators, one can achieve more than 3/4 of the usability problems. His research has shown that adding the number of evaluators does not bring about significant difference in determining the usability condition

and identifying the problems of database.

Findings

The average of each sub-criterion was calculated to find out the compliance of the database with the checklist.

In table 1 the number of conformity and inconformity related to each criterion is presented.

Table 1

Number of Conformity and Inconformity of the Criteria

Criteria	Yes	No	Total
Visibility of system status	3	8	11
Consistency and standards	8	4	12
Error prevention	3	2	5
Aesthetic and minimalist design	6	0	6
Help and documentation	0	9	9
Total	20	23	43

In general, research data reveals that among five main criteria of the study, 20 out of 43 criteria were in compliance with the research checklist and 23 out of 43 were not.

The percentage of the non-observed criteria in comparison with observed criteria is presented below.

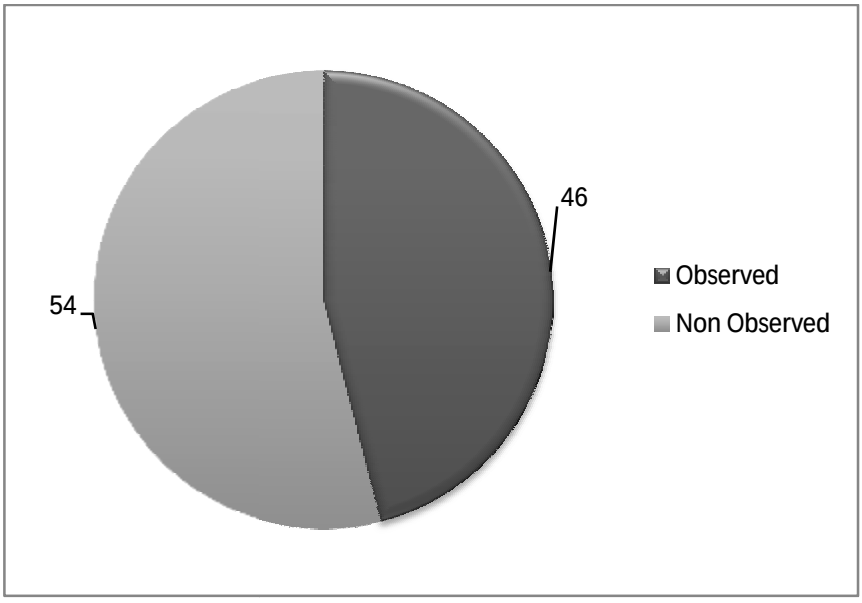

Figure1. Comparison of observed and non observed criteria.

Table 2

Severity Rating of the Problems

Criteria	Severity Rating of Problems
Visibility of system status	1.6
Consistency and standards	0.4
Error prevention	0.84
Aesthetic and minimalist design	0
Help and documentation	2.2
Total Average	1.008

In evaluators point of view, the most severe problem was "Help and Documentation" with a mean of 2.2. After that,"Visibility of system status" with a mean of 1.6 was the most severe problem. "Error Prevention" and "Consistency and Standards" with the means of 0.84 and 0.4 in order were the third and the forth level of problems.

The "Aesthetic and Minimalist Design" criterion was recognized to be no problem at all.

Discussion and Conclusion

In this study, among five main criteria for the usability proposed by Jakob Nielsen, the "Aesthetic and minimalist design "criteria including a total of six sub-criteria, was fulfilled by all components and thus gained zero severity rating accordingly, it stood on the best possiblecondition.It demonstrates that web designers have implemented usability principles in designing web pages of given database. Yushiana and Widyawati in 2007 also indicated the same results. They showed in a study the 90% conformity of the checklist with the website.

"Help and documentation" criterion, was identified as non-compliance with the checklist. However, "visibility of system status" criterion, obtaining a severity rating of 1.6, stayed in a relatively favorable condition.

Abbaspour (2006) study was also confirming the lack of adequate compliance with the "display" criterion in the thesis database of the Iranian Research Institute for Information Science and Technology (IranDoc). In Yushiana and Widyawati (2007), it was revealed that 80% of the participants agreed with the observation of 70% of the checklist.

The third rank of the problems found in the database, belongs to the "error prevention" criterion with a severity rating mean of 0.84. The reason for obtaining this score was the lack of the support by database for the prevention of making error by user and also the lack of informing the user of the error in the event of doing a particular action. Likewise, Abbaspour (2006), in his study, concluded that the user is not encouraged to correct the searching strategy and retrying due to insufficient error messages in the user interface of the thesis database of the Iranian Research Institute for Information Science and Technology (IranDoc).Fatahi and Entezarian (2009) also showed that the rate of error message in the two databases of the electronic articles of the Regional Information Center for Science and

Technology (RICeST) and articles database of the Iranian Research Institute for Information Science and Technology (IranDoc)is low.

"Consistency and standards" criterion, with severity rating of 0.4, had a relatively favorable status and enjoyed a better condition.In Fatahi and Entezarian research (2009), they demonstrated that the words and phrases applied in the Regional Information Center for Science and Technology (RICeST) were in a better condition compared to the Iranian Research Institute for Information Science and Technology (IranDoc) in terms of the comprehensibility of terminology, consistency and search options.

Icons applied at the graphical user interface needed more attention in terms of familiarity and adaption with current cultural customs.

Research Proposals

According to the result of this study, the researcher suggests:

1- To extract a list of strengths and weaknesses of the database.

2- To develop and improve the strong points.

3- To modify database design in places recognized as a weakness.

4- To plan a iterative evaluation program for further improvements and updates.

5- To design user interface based on the real demands of the target groups or end users.

6- To consult divers groups like librarians, information scientists, computer scientists, psychiatrists, etc in designing databases.

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