Usability Guidelines for Arab E-government Websites

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Abstract—The website developer and designer should follow usability guidelines to provide a user-friendly interface. Many guidelines and heuristics have been developed by previous studies to help both the developer and designer in this task, but E-government websites are special cases that require specialized guidelines. This paper introduces a set of 18 guidelines for evaluating the usability of e-government websites in general and Arabic e-government websites specifically, along with a check list of how to apply them. The validity and effectiveness of these guidelines were evaluated against a variety of user characteristics. The results indicated that the proposed set of guidelines can be used to identify qualitative similarities and differences with user testing and that the new set is best suited for evaluating general and e-governmental usability.

Keywords—E-government, Human Computer Interaction, Usability Evaluation, Usability Guidelines.

I. INTRODUCTION

MANY researchers, such as Jacob Nielsen, have established usability guidelines for designing websites, but those guidelines are abstract, and each website developer or designer can provide a different explanation for every abstract guideline. Therefore, these guidelines must be specialized for each website's purpose and targeted audience because each website type has a different use and different users. E-government guidelines must be developed to remove all of the barriers of designing an e-government website that suits its own purpose. In this thesis, 17 heuristics with explanations are proposed for more detailed and focused guidelines concerning Arabic e-government websites. When those guidelines were gathered, they were divided into three groups focusing upon three aspects: website interface design, website content, and website logic flow.

II. RELATED WORK

Usability refers to the ability to learn, interact with, and use a product or service to achieve the purpose that it is meant to facilitate. The International Organization for Standardization (ISO) 9241-11 defines usability as

"The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in the specified context of use"

Similarly, Neilson defined the term as the ease of use of the user interface of a product or service. Neilson measured the

usability based on ease of learning, efficiency, memorability, errors, and satisfaction. The aim of measuring the usability is to enhance the ease of use of products and services. All website developers are trying to achieve the highest level of usability for the developed website.

Although many researchers have developed guidelines to help developers design usable websites, few studies have investigated the issue of e-government guidelines. Governments have realized the importance of the usability of their e-government websites. E-government websites must be usable for all website users, including those who are disabled [1]. The general guidelines are useful in the design phase. However, more specific guidelines for e-government websites are necessary to fulfill the websites' intended purpose. E-government websites have not achieved their full potential because the majority of people do not use them due to the weakness of the websites' usability [2], [3].

Many studies and researches have been developed to measure the usability of e-government websites in the Arab region and worldwide. Improving the usability of the e-government website will increase the website users' satisfaction. Having users with higher satisfaction will reduce the cost of having field interaction with the citizens [4], [5]. Governments are faceting difficulties in finding the best method to design the website to have the best interact with users [6]. For that, developers should establish studies to make sure that the users are satisfied with the provided services. Many approaches can be implemented to achieve that, such as user-based testing. It is the most important evaluation method since it's involves end users that will eventually use the e-government website. Researchers have used this approach and it helped them to improve the usability of the websites and increased the number of the website users [7], [8]. Some researchers also studied the end-users attitude and culture and make it in consideration when designing the e-government website [9]. Another study has also suggested that the user-based evaluation technique must be implemented frequently and not only once, since the end users needs are changing through time [10]. Inspection is another approach also used by researchers and found out that it is cost efficient approach for measuring the usability of the e-government website [11]. The main challenge faced the researchers with this approach is choosing the most efficient usability guidelines that they will evaluate the website based on [12]. If the time is limited, the best method to measure the usability of a website is using an automated tool. A study has examined many automated usability testing tool and found out that it is more sufficient than evaluating the website by the developer himself. Moreover, they found that most of the developed tools

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World Academy of Science, Engineering and Technology
International Journal of Computer and Information Engineering
Vol:7, No:12, 2013

examine the evaluations related to vision problems [13]. A study has also suggested for the evaluator to develop his own usability evaluation tool based on the website category and use it in maintaining the level of the website usability [14].

Nowadays technologies provide wide range of new opportunities to connect to e-government website using. Therefore, developer should consider involving the utilization of all kinds of wireless and mobile technology, services, applications and devices for improving benefits to the parties involved in e-government including citizens, businesses and all government units. Measuring the usability and accessibility of different mobile devices with different platforms is not easy [15], [16]. Korea discussed the importance of implementing mobile e-governments websites version where each government website has another mobile website developed with special requirements for mobile devices. Nevertheless they are facing challenges in finding the best technology and guidelines to follow to reach their best potential [17]. When designing interfaces for mobile e-government, developer should also consider different mobile networks infrastructure and security [18], [19]. There are few studies in mobile government field and it is still in its early stages.

The usability guidelines that should be implemented on e-government website are different than the e-commerce usability guidelines since the nature of the users of each type is different. Moreover, the in e-government website there are no competitors rather satisfying the user's needs [20], [21]. However, many studies showed that the users are having difficulties in using the services provided by the e-governments' websites [22], [23]. A field study conducted by Holden et al. resulted in finding that the reason of not using e-government website by many people is because they found difficulties in using the provided services [24]. Another field study resulted in finding that most of the e-government websites are not consistent in the design nor standards and features used [25]. There for the majority of the e-government websites needs more development and are in early stages. For that, they need more improvements to meet with the users expectations [26]. Based on those usability studies, e-government usability guidelines are essential to improve the quality of the e-government website.

The guidelines presented in this paper are developed based on experiment, literature review and conducted usability experiments. These sets of guidelines are also based on Nielsen's 10 heuristics, which are generic and might not encompass usability attributes specific to e-governmental websites. The new set of guidelines would overcome these shortcomings. Combined with user testing, the new set will offer a new track that will assist in guiding the governmental industry to design applications that are easy to use and easy to learn. When those guidelines were gathered, they were divided into three groups focusing upon three aspects: website interface design, website content, and website logic flow.

III. Interface Design of the Website

The interface design and the appearance of the e-government website are very important because they are the first things that attract the user; the user will either be encouraged to continue using the website or close the website if he/she is unhappy with the website interface design. The following are the e-government interface design heuristics with detailed evaluation checkpoints that the evaluator can use to make sure that the website interface design is user friendly:

Interface Design Guideline 1: The webpage has a title.
- Measurement checklist:
a. All pages contain a title in the title bar.
b. The title is related to the content of the page.
c. Each page title is unique.

Interface Design Guideline 2: The language of the page should be identified.
- Measurement checklist:
a. The language used in the content of the page is stated in the HTML code of the website.
b. The format of the code of the language clarification is consistent with special needs browsing tools.
c. English page alignment is left to right, and Arabic page alignment is right to left.

Interface Design Guideline 3: Headings are consistent in style.
- Measurement checklist:
a. Different heading levels have different styles.
b. Each heading level has a consistent style throughout the website pages.

Interface Design Guideline 4: Provide different font styles for the content.
- Measurement checklist:
a. The website provides at least two font size options.
b. The website provides different color designs for the people suffering from color blindness.

Interface Design Guideline 5: The page should have print and save options.
- Measurement checklist:
a. A printer-friendly and PDF version of the website is provided.
b. The page is converted into black text and white background for printing.

Interface Design Guideline 6: The website is fast to download.
- Measurement checklist:
a. The size of the media on the website does not exceed 60 KB [27].
b. The website does not contain non-essential multimedia.

Interface Design Guideline 7: The website has a mobile version.
- Measurement checklist:
a. The website checks the device used to browse.
b. The mobile version follows mobile usability guidelines.

IV. Website Content

If the content does not provide the information needed by users, the website will provide little value regardless of how easy it is to use [28]. Therefore, preparing the content of the e-government website is critical and required additional

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attention to make it very easy to deliver the information to the user. According to Trenton Moss, director and founder of the user experience consultancy, Webcredible, "Reading from computer screens is tiring for the eyes and about 25% slower than reading from printed matter" [29]. The following is the group of guidelines that the e-government website developer should be concerned with when preparing the content:

Content Guideline 1: Images and media.

- Measurement checklist:
a. Each image/media element has a caption providing an explanation.
b. The caption is unique.
c. Watermark graphics are not used because the users will not see them clearly [30].

Content Guideline 2: The website should be updated regularly.

- Measurement checklist:
a. The date of the last update is stated on the page.
b. The page is updated at least every 3 months [31].

Content Guideline 3: Make the content of the webpage usable for users with different disabilities.

- Measurement checklist:
a. Conversion tools, such as text-to-speech and speech-to-text, are used for blind and physically disabled people.
b. Arabic pages have only Arabic text, and English pages have only English text so that screen reader tool can process the text.

Content Guideline 4: The webpage should not be long.

- Measurement checklist:
a. Lists are used to divide the paragraphs.
b. Sentences do not contain more than 20 words [32].
c. Paragraphs do not contain more than six sentences [32].

Content Guideline 5: The website should be secured.

- Measurement checklist:
a. The website shows an information security logo.
b. The website shows a payment secure logo.

Content Guideline 6: The website should contain contact information.

- Measurement checklist:
a. The website contains a contact page with an email address, phone number, and fax number.
b. The website contains a link to a social media account, such as Twitter or Facebook.
c. The website provides a chatting option.

V. LOGIC FLOW OF THE WEBSITE

The logic follow of the website refers to how the website links are organized, designed, and structured. The users should have a clear overview and logic flow of the website structure, making task accomplishment easier for website users. If the logic flow of the website is badly designed, then the website user becomes disoriented and takes longer to find the desired information or service. *"A good navigation structure and navigation tools help users find information easily and quickly on web pages."* [2] The following are guidelines for designing

the logic flow of an e-government website that the website developer and designer can follow.

Logic Flow Guideline 1: Menu and hyperlinked text is user friendly.

- Measurement checklist:
a. There are no broken links on the page.
b. Visited links are marked.
c. Hyperlinks clearly state the information to which they are linking.
d. The website does not contain more than three levels of menus.
e. A back to home page link is available on each page of the website.

Logic Flow Guideline 2: Website domain name.

- Measurement checklist:
a. The domain name of the website is meaningful.
b. The domain name is easy to remember.
c. The domain name is consistent for all e-government websites for a country.

Logic Flow Guideline 3: Handling mass users' connections.

- Measurement checklist:
a. The website is able to handle many connections at the same time.
b. The website downtime is minimal.

Logic Flow Guideline 4: Search Engine.

- Measurement checklist:
a. The website provides a smart search engine that can provide results based on keywords.
b. The search engine should show related topics within the search results.

VI. CONCLUSION

This paper presents guidelines for the usability of e-government websites. Those guidelines will make the website more usable and accessible for users and more easily provide the online services to users. The guidelines are divided into three parts: the interface design and appearance of the website, the content of the website, and the logic flow of the website. Each part is concerned with a different field of e-governmental usability. The interface design guidelines of the website will help the user be pleased with the interface while navigating. A consistent and well-designed website makes the user feel that the website can be trusted. The content guidelines are concerned with how the content is organized, secured, and updated. The logic flow of the website is important in making the use of the e-services easier for users. Having a difficulty to navigate website leads the user to prefer to go to the governmental office to get service or information instead of using the e-government website. There are many e-governmental guidelines and rules to design and evaluate the e-government websites, but having usability guidelines specialized for e-government websites will make finding major problems simple and easily, and evaluation using those guidelines is supported by using a tool to run, which will lead

World Academy of Science, Engineering and Technology
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to improved website performance and an increased number of users using the online services.

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