Developing a Framework for Localised Web Accessibility Guidelines for University Websites in Saudi Arabia

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Abstract. This paper presents a new framework for localised web accessibility guidelines for university websites in Saudi Arabia. The main purpose of this framework is to provide the basis for the development of localised guidelines. Applying these localised guidelines on Arabic websites would enhance their accessibility for Arab people with disabilities. The development process of the new framework is described in detail. This process involved three phases, determination, synthesis and specification phases. The proposed framework comprises six main components; web accessibility, genre-specific cultural markers, costs, user diversity, Internet infrastructure and technology variety.

Keywords: Web accessibility guidelines · Localisation · Culture · Disability · Saudi Arabia · University websites

1 Introduction

People with disabilities in Saudi Arabia were estimated to be more than 700,000 in 2015[1] which constitutes over 7 % of Saudi citizens. Among those disabled, there are individuals who have an interest in accessing the content of university websites for different reasons. For instance, to apply for a university degree or to find information about the university and courses. Therefore, there is a pressing need for proper web accessibility guidelines in order not to exclude people with disabilities from obtaining the benefits of accessing university websites [1].

Web accessibility guidelines such as Web Content Accessibility Guidelines (WCAG 2.0) [2] that are developed in Western countries (North America and Western Europe) are used by some Arabic developers when developing Arabic websites [3]. However, some of the success criteria or the guidelines do not fit all cultures and all languages. Applying the WCAG 2.0 guidelines to Arabic websites would raise more accessibility issues and require different success criteria and possibly even techniques to maintain accessibility levels. This problem has been reported by a number of researchers, as they suggest the importance of adapting the accessibility guidelines to the Arabic context [4, 5, 8]. The current paper seeks to contribute to this body of

[1] http://rs.ksu.edu.sa/82739.html
http://www.alriyadh.com/104799 .

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knowledge by developing a new framework to localise accessibility guidelines for university websites in Saudi Arabia.

In this paper, related work is discussed in Sect. 2. Section 3 explains the development process of the new framework. The proposed framework with its components is described in Sect. 4. Section 5 concludes with a summary of the paper.

2 Related Work

To the best of the researchers' knowledge and based on the literature review, limited studies on web accessibility of the Arabic websites have been found. The main focus of these studies such as [1, 5–8], is on evaluating web accessibility of e-government websites in a number of Arabic countries. Among those studies, [1] was the only one found to assess the accessibility of university websites in Saudi Arabia, however, it focuses on the English versions of these websites not the Arabic ones. There has been a consensus on the low accessibility levels of the examined websites and a lack of awareness of its impact on people with disabilities. Moreover, the issue of localisation to the Arabic context and its influence on accessibility has not been investigated by these studies.

This paper aims to address this gap by providing a better understanding of Arab people and their their approach to web based information and their preferences as to how it is presented This understanding and other accessibility related issues have been developed into a framework to localise accessibility guidelines. To make this research more achievable, the study is focuses on one Arabic country, which is Saudi Arabia and one website genre which is university websites.

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The framework has been developed by investigating the literature in a number of research areas. These areas comprise: web accessibility as the main area, with different guidelines that contribute to accessibility, and also cultural, technical and financial aspects and their impact on accessibility guidelines. Each one of these areas has contributed to the development of the framework. The framework has been developed in three main phases:

3.1 Phase One

The purpose for the first phase was mainly to determine, from literature, the components and aspects that need to be considered when localising web accessibility guidelines. This determination phase involved the following steps:

1. Identification and review of the literature concerned with web accessibility and localisation.
2. Identification of the components that need consideration in the localisation process.
3. Exclusion of the components that are not relevant to building localised web accessibility guidelines, such as accessibility of web authoring tools.
4. Categorisation of the components based on their meaning and scope.

The first phase resulted in the identification of seven components; namely web accessibility, cultural markers, genre markers, costs, user diversity, Internet infrastructure and technology variety.

3.2 Phase Two

In the second phase, the components and all of their subcomponents and elements identified in Phase One were synthesised to form the framework for localised web accessibility guidelines. This phase involved the following steps:

1. Extraction of any duplication among the components, subcomponents and elements.
2. Synthesis of the components that have duplicated subcomponents and elements.

Two components were synthesised in this phase and made one component which became genre-specific cultural markers.

3.3 Phase Three

As this research investigates the localisation in a Saudi context, some of the identified components in Phase Two needed more specification in the third phase.

1. Review of the literature concerned with localisation for Saudi Arabia.
2. Identification of the components that may challenge or facilitate the localisation for a Saudi context and specifically university websites.
3. Detailed specification of culturally related components and their subcomponents.

One component with its subcomponents was specified in detail in this phase: genre-specific cultural markers.

4 Proposed Framework

Figure 1 shows the proposed framework with all of its components and subcomponents.

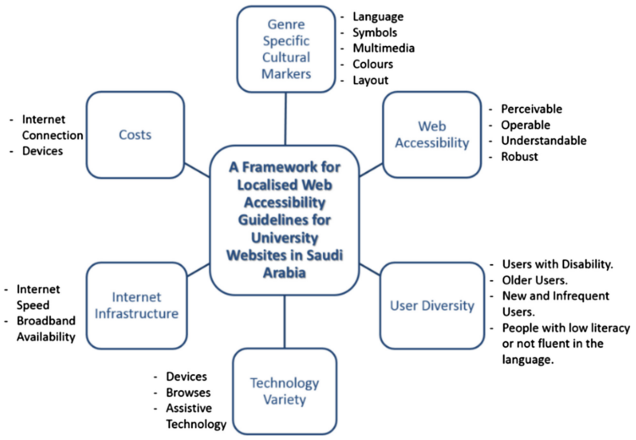

Fig. 1. A new framework for localised web accessibility guidelines for university websites in Saudi Arabia

4.1 Genre Specific Cultural Markers

Cultural markers are interface elements and features that are acceptable and preferred within a particular cultural group [9]. Genre specific cultural markers are elements and features of a specific website genre for a particular cultural group [9]. This component comprises 5 subcomponents as described below.

Language. As the official language in Saudi Arabia is Arabic, a brief explanation of the features of this language and how it is different from English is provided. Arabic is spoken as a first language by over 200 million people, mostly in the Middle East and North Africa, and was ranked fourth language in the world in terms of the number of native speakers[2].

- **Direction of Reading and Writing**: Arabic is considered as a Semitic and bi-directional language because the script is read and written from right to left, whereas numerals are read from left to right [10, 11].
- **Uni-Case Language:** no upper or lower case variations in Arabic.
- **Formation of the Letters:** Each letter may have two to four different forms depending on its position in the word. Arabic letters consist of 17 base letters. The remaining letters are made up by the addition of dots that can vary in number and position. As a consequence, distinguishing these letters could add to the difficulties faced by Arabic readers [11].
- **Cursive Form and Spaces:** Arabic script is written in a cursive style with the letters being joined to each other by ligatures. Of the 28 letters, only 22 are two way connectors, while the remaining six letters cannot be joined as they are one way connecting letters. For this reason, an Arabic word may have one or more spaces

[2] http://www.ethnologue.com/statistics/size .

within the same word depending on how many of these letters are used in the word [12]. These spaces together with the fact that Arabic is a uni-case language can cause a problem in identifying the boundaries of the words in Arabic script, especially for poor or beginner readers.

- **Diacritical Marks:** In Arabic, diacritical marks (small diagonal marks above or below letters) are used to represent short vowels and help readers in pronunciation [12, 13]. Reading accuracy in Arabic requires the vowelising of word endings according to their grammatical function in the sentence (for example, subject or object), which needs a high level or linguistic skills comprising phonological and syntactical processing [13]. However, websites that have content in this type of orthography are very limited [14].
- **Homographic Language:** A huge number of Arabic words appear as non-vowelised, when appearing out of context, are homographic [12]. This means homographic words can carry more than one pronunciation and meaning, which causes semantic and phonological ambiguity. In this case, the context is needed to ensure the correct reading for these words.
- **Gender-Specific Language:** Arabic is a gender specific language, resulting in some spoken and written words having a different form based on their male or female type. Sometimes, diacritics are needed in text to differentiate between genders [15].
- **Font Type, Size and Text Emphasis:** to achieve more clarity in the presented Arabic text, [14] recommended paying attention to the font type, size and the emphasis of the text. The fonts that have flowing cursive form with full and deep curves and straight and vertical uprights are much clearer than angular types. The recommended text size was in the range of 16-20pt, which is why Arabic script usually appears in larger sizes than English, in print and electronic form.
- **Alignment of Text:** The Arabic justification of text alignment should be right justified or fully justified. Fully justified text was not considered as a problem because in Arabic, words can be stretched to fill the width of the line instead of introducing inconsistent spaces between words as in English [16].
- **Diglossic Language:** Arabic is highly diglossic [10], which means Arab people use a localised form of spoken Arabic in their homes and neighbourhoods, a language totally different from Modern Standard Arabic (MSA). This linguistic phenomenon is called diglossia [17].
- **Long Sentences:** [14] agreed that shorter sentences are easier to read and understand. However, the nature of Arabic allows for longer sentences that span many lines, in contrast to English.

Symbols. Some symbols are strongly culture-defined because what they represent is not available in another country. Using inappropriate symbols that the user cannot recognise or with which they identify therefore reduces the accessibility of the web product. Moreover, the use of certain symbols, icons, or images may be offensive or even against the law in some countries [3].

Multimedia. The use of multimedia in a website would differ from one culture to another [18, 19]. According to [20], Saudi users prefer to have more images and less text compared with Western countries who prefer more text and fewer images. For

designing Arabic websites it is important to choose pictures that do not have an impact on a conservative society [21].

Due to the fact that some people in Saudi Arabia do not listen to music and believe it is forbidden from a religious point of view depending on how conservative they are, if a Saudi user navigates a website that presents a video with music in the background, for example, he might not continue watching it and consequently quit the website. Although, this is not the case for all Arab users, as they differ in their beliefs and traditions, an appropriate way to deal with such a situation is needed, and this is not found in the existing guidelines. So, besides providing text alternatives for the video, the developers would provide a hint for people that there is music in the video, and/or provide another version of the video without music if they prefer no music ([22] discusses the issue of music in Islam).

Colours. Colours are related to emotional and cultural associations and can have an influence on users from different cultural backgrounds [9]. Colours might produce varying emotional reactions that can impact accessibility.

Layout. Page layout refers to the display layout that guides scanning information and reflects the logical flow of task [18, 19]. Appropriate menu design and layout would give a website's users with a contextual and structural model for understanding and accessing information [18]. Page orientation differs from culture to another due to text direction, for example, for right to left Arabic text the side menu will change in direction to be on the right [9].

4.2 Other Framework Components

- Web Accessibility: This component focus on making websites perceivable, operable, understandable and robust [2]. So, people with disabilities can perceive, understand, navigate, and interact with the web, and that they can contribute to the web [23].
- User Diversity: Users with disabilities, older users, new and infrequent users and people with low literacy or those not fluent in the language [2, 23] should be considered when aiming to develop an accessible websites.
- Technology Variety: A broad range of hardware and software needs to be supported [24]. Moreover, the use of different assistive technologies, which are used by people with special needs, should be taken into account.
- Internet Infrastructure: Internet speed and broadband availability in the country could affect the ability to connect to the web which may also influence accessibility of the web content [25].
- Costs: Users could be prevented from accessing the Internet and surfing the Web due to the high costs of devices and Internet connection [26, 27].

5 Conclusion and Future Work

This paper presented the process of developing a framework for localised web accessibility guidelines for university websites in Saudi Arabia. The resultant framework consisted of six main components which are relevant to the process that could offer those with disabilities more equitable access.

After developing the framework, the next immediate task will be to carry out an expert evaluation study to investigate the agreement among a number of experts on its components. The purpose of this activity is to confirm the framework and explore other additional components. The expert review will be conducted by interviewing a panel of native Arabic speakers. The experts will be either developers of university websites in Saudi Arabia or researchers in the area of web accessibility.

The framework will be endorsed having received confirmation from the experts that it would provide the basis for the development of localised guidelines.

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