

Wish Lists and Shopping Carts: A Study of Visual Metaphors on Arab E-Commerce Websites

Divakaran Liginlal^(✉), Maryam Al-Fehani, Preetha Gopinath, and Alex Cheek

Carnegie Mellon University Qatar, Education City, PO Box 24866 Doha, Qatar
{liginlal, malfehani, preethag, alexcheek}@cmu.edu

Abstract. A review of 3065 Arab e-commerce websites revealed that Web designers mostly adopt Western-influenced interface metaphors and pay scant attention to creating Arab culture-specific visual metaphors. In this research, we first collected and analyzed Arabic stories to extract themes for the creation of culturally attuned visual metaphors for use as Web interface elements. After considering various plausible themes, we specifically focused on the “wish list” metaphor as the object of our study. A subsequent eye-tracking experiment based on alternative designs of a shopping website provided evidence that participants paid more attention to the localized elements of website design. A questionnaire-based study further confirmed that localization of site design in general, and the use of culturally attuned visual metaphors in particular, gains the attention of Arab e-shoppers. The results provide both practitioners and researchers deeper insights into how culture shapes the design of websites.

Keywords: e-commerce · Culture · Visual metaphors · Icons · Eye-tracking

1 Introduction

Many researchers in the information systems discipline have studied the influence of culture on website design [1–3]. One common approach to measuring the cultural influence in the design of a website is to look at cultural markers. Khanum et al. [4] define cultural markers as “interface design elements that are largely influenced by cultural values.” Our literature review confirms that the use of metaphors as cultural markers that influence the design of e-commerce websites has attracted little research interest. As Lakoff and Johnson [5] succinctly put it, “the essence of metaphors is understanding and experiencing one kind of thing in terms of another.” A visual metaphor can be defined as the use of a visual element—image—(from one domain) representing another visual element from a different domain [6].

A study by Shen et al. [7] examined culture-centered design specifically in terms of Chinese culture. They applied a Chinese garden metaphor to create a Web browsing experience. Another study that explored culturally attuned user interface icons was by Heukelman and Obono [8]. Their study examined the possibility of an alternative to office metaphors by using an African village metaphor. These studies are examples of research targeted at Chinese and African cultures. Our literature search confirms that very few studies have looked at Arab e-commerce websites and culturally attuned visual metaphors [9].

2 Research Model and Methodology

Our research aims to answer one primary question: Does the use of visual metaphors that relate to Arab culture enhance the experience of Arab shoppers on e-commerce websites? In simple terms, the research aims to discover if the integration of Arab culture and visual metaphors influences Arab users of e-commerce websites.

We gathered thirty-three stories from books and from older citizens knowledgeable of Arab folklore and analyzed them to identify live characters, imaginary creatures, and inanimate objects. About 100 corresponding images were then collected from many sources on the Web to distill features that facilitated the creation of visual metaphors. Figure 1 shows examples of culturally adapted shopping cart icons and culturally adapted designs of the wish list icon conforming to the theme of Aladdin’s lamp.



Fig. 1. Examples of icons resulting from the creative design process

Eye-tracking involves the process of measuring where an individual’s eyes are focused at any given time, i.e., the gaze point, and the sequence of movement of the eyes from one point to another (saccades) [10]. Because eye-tracking alone may not help explain why a user is looking at a specific object or point in an image, our approach combines both eye-tracking and questionnaire studies.

Two alternative designs shown in Fig. 2 were considered for an eye-tracking experiment. For the Western-influenced design, the logo is simply the name of the business, Souq, which means shop. The icons and image are commonly used Western-influenced banners and product images and interface icons. For the Arab-influenced design, the logo is the word Souq written in Arabic, and the women and men icons represent Arab culture because they are wearing traditional Arab clothes. The wish list icon is portrayed with a magical lamp drawing inspiration from the popular Aladdin folklore.

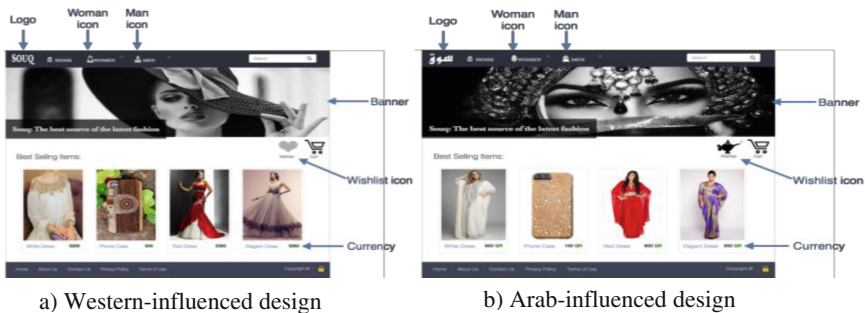


Fig. 2. Home page design of e-commerce website

The interview questions were designed to identify features of the website that attracted the participants the most, the images or icons they could recall, and their specific and general impressions of the visual imagery of the site. Responses to another question that attempted to measure the perceived cultural affinity of the participant toward the viewed website were coded in such a way as to elicit a binary yes/no response. The participants were also required to retrospectively list the things on the website (pictures, icons, text) that made the website culturally friendly to them.

The study was conducted at Carnegie Mellon University's Qatar campus. All target participants were university students of Arab nationalities, age 18 or older, and native Arabic speakers. Because of the high resource requirements for eye-tracking studies, we reduced our number of participants to 10 for each design. The male-female ratio was 1:3. After viewing a warm-up website to help the participant adjust to viewing a website with the eye-tracker, the participant was asked to browse and navigate through the website to complete a shopping task. After completing the task, each participant answered the questionnaire containing 10 short questions about the website. Each study was completed in less than an hour.

3 Results and Discussion

Tobii Studio generates heat maps that represent the different areas of a screen where a user has looked longest. Orange and red areas represent the most time focused on an area of the screen, and green and yellow show those screen areas watched the least. The heat map shown in Figs. 3(a) and (b) clearly indicate that the wish list icon of the Arab-influenced design received the most attention relative to that on the Western design. Table 1 lists the mean values of the metrics generated from the eye-tracking data.

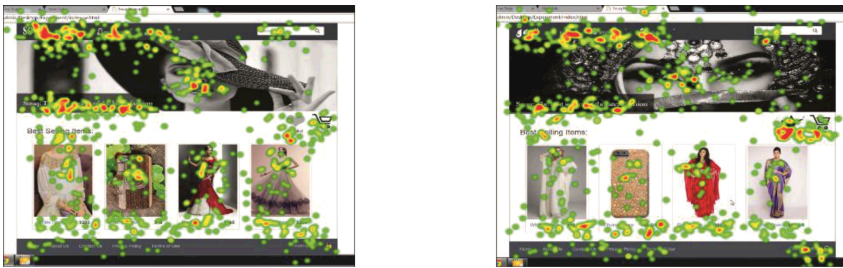


Fig. 3. Heat maps on home page of (a) Western-influenced site (b) Arab-influenced site

The time from the start of the stimulus display until the test participant fixates on the wish list icon for the first time was measured by the time-to-first-fixation metric. The mean values are 7.858 s and 5.698 s, respectively for the Western and Arab-influenced designs. Table 1 also shows the results of the student t-test for related comparison of means. The p-value of 0.18 and the t-value of 0.93717 are not high enough to assert statistically significant difference in the means. A fixation occurs when a participant's eye movement pauses on a specific area of the webpage, in this case the wish list icon.

The total fixation duration is the duration of all fixations on this area of interest. The mean total fixation duration of 1.155 s for the wish list icon in the Arab design is significantly greater than that of the mean total fixation duration of 0.47 s on the alternative design (t-value of -2.2969 ; p-value = 0.0169). Therefore, it appears that participants seemed to focus longer on the culturally attuned wish list icon, indicating greater interest.

Table 1. Key metrics from eye-tracking of the wish list icons

	Time to first fixation		Total fixation duration		Fixation count	
	Western	Arab	Western	Arab	Western	Arab
Mean	7.85 s	5.69 s	0.47 s	1.15 s	1.8	4.4
Df	18		18		18	18
t Stat	0.9371		-2.2969		-2.0413	
P(T <= t) one-tail	0.1805		0.0169		0.0280	
Observations	10	10	10	10	10	10

The fixation count is the number of times a participant fixates on the wish list icon. The mean fixation count of 4.4 s for the wish list icon in the Arab design was significantly greater than that of the mean fixation count of 1.8 s on the alternate design (t-value of -2.04135 ; p-value = 0.0280). Once again the culturally adapted icon scored higher by attracting more number of fixations than the Western-influenced design.

Based on analyzing the questionnaire, we found that most participants felt the icons on the Western-influenced site were “international” or “regular.” The participants related most to the Arab-influenced website and felt that it reflected their culture. Most of the participants, i.e., eight of 10, retrospectively referred to the wish list and other culturally attuned icons and felt that they helped them relate the website to Arab culture. For instance, one of the participants said, “The icons for men and women were interesting, I thought, because of the cultural aspect, like they were dressed culturally appropriate. And I thought the genie lamp was interesting for the wish list.” A majority of the participants, nine of 10, felt that the cultural markers on the website represented their culture. Analysis of the responses to the question on perceived cultural affinity showed that the Arab participants felt more cultural affinity for the Arab-influenced website (t Stat = 3.641115; p (T <= t) two-tail 1.05E-07), further confirming the qualitative data obtained from the interviews.

4 Conclusions and Implications

The positive influence of culture on the design of websites and related consumer acceptance has been studied and documented well. As described in the paper, we created numerous visual metaphors based on themes from Arabic folklore. Of these we selected a few for inclusion in the design of a website for an eye-tracking experiment. The results showed that cultural affinity appeared to be higher for the Arab-influenced design, and greater attention was paid to the culturally attuned wish list icon. Some major limitations

of the study design included the use of English language to drive the content and the small sample size of the participant pool.

As prior studies have mentioned, the use of cultural elements and cultural affinity affect the way users view websites. This research provides interesting insights for businesses, Web designers, and other researchers in Arab countries. Businesses can use the findings of this research to improve their websites and better reach their target audiences. The findings of this research will also help Web designers communicate better with users. This study may encourage other researchers to further investigate culturally attuned visual metaphors among other cultural elements in e-commerce websites.

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