

Culture and Information Architecture: A Study of American and Arab Academic Websites

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ABSTRACT

This paper investigates the information architecture (IA) of American and Arab academic websites in light of Hofstede's theory of culture and Marcus's elements of design reflecting culture. Using 60 academic websites from American and Arab cultures, the results show that IA is influenced by the cultural dimension of Power Distance and suggest that web designers and developers should strongly consider cultural factors when making design decisions, particularly those related to IA.

Keywords

Information Architecture, culture, web design

INTRODUCTION

It is agreed upon by information architects and interaction designers that well-designed websites improve the performance and the appeal of the Web, helping to convert "tourists" or "browsers" to "residents" and "customers" (Marcus et al., 2000, p. 3). The user has always been the starting line where the designer departs, going back to assess and evaluate the product and iteratively improving the design according to the users' wishes and preferences. The designer, by being empathic, tries to understand users' profiles and thus acknowledges their diversity. In today's global economy, website designers should consider the impact of culture on the ways users interact with their websites and design their sites to account for different cultural norms and expectations. While some cross-cultural studies considered the differences in design, none has focused particularly on Information Architecture (IA). This paper endeavors to identify differences between Arab and American cultures that manifest in the IA of websites designed for those populations. The main research question

is: to what extent does the IA of Arab websites differ from the IA of American websites?

REVIEW OF LITERATURE

Culture and Websites' IA

Many sociologists and anthropologists have tried to come up with a definition of "culture" which has yielded thousands of definitions across the literature. Hofstede, Hofstede, & Minkov (2010) define culture as common thoughts that discriminate an individual who belongs to a certain group or class. Culture affects everything people do in their society because it shapes their ideas, values, attitudes, and normative or expected patterns of behavior (Hall, 1976; Searle, 1995).

In cyberspace, websites from different cultures can be accessible in fractions of second but a website can be considered useful only if its visitors can get the information they are looking for efficiently. Websites should have a structure that considers the culture and cultural differences of their users so as to be able to communicate the information. Cultural differences directly affect features of use regarding the target audience, specifically in web applications with universal themes (Marcus & Baumgartner, 2004; Marcus & Gould, 2000).

Hofstede's Model of Culture

Many researchers and web designers have used Hofstede's model of culture to measure the extent to which certain features on a website are a manifestation of a specific culture (Eristi, 2009; Gevorgyan & Porter, 2008; Marcus & Gould, 2000; Rahim & WMI, 2008). Hofstede formulated his model of culture dimensions based on surveys and interviews with several hundred IBM Employees. He started with 53 countries in 1978 and by 1983 he expanded to 74 countries. Hofstede determined patterns of similarities and differences in how signs and values are expressed by group members. Hofstede's culture dimensions, or indices, are the following: Power Distance, Individuality, Uncertainty Avoidance, Gender Role Differences and Time Orientation (Hofstede-Center, 2014).

The power distance cultural dimension reflects the level of inequality that people in a given nation are willing to accept

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(Hofstede, 1980, 1984; Hofstede-Center, 2014). This dimension, which we chose to focus on in this paper, indicates how individuals perceive inequalities in their society. People from high power distance cultures view the power and hierarchy as “natural” components of their life and thus people from these countries generally obey the state. On the other hand people from low power distance societies prefer limited government, intellectual independence, and nonconformity.

Research about the culture and web design

Eristi (2009) analyzed 15 websites from 11 countries to evaluate the cultural quality of design elements in light of the 5 dimensions in the cultural theory of Hofstede. Eristi found significant differences across regions that can be observed when sites from the same region are considered together. Rahim and WMI (2008) conducted usability evaluation sessions using 2 prototypes. One prototype displays the Muslim cultural dimensions according to Hofstede’s and the other has no cultural cues. The authors surveyed 44 Middle Eastern and 44 Malaysian post-graduates. The results of the study indicated that when websites considered the cultural dimensions of the Muslim users, there was a positive effect on their performance and satisfaction level. Marcus and Hamoodi (2009) analyzed Arabic websites from 3 countries in the light of Hofstede’s theory. They noticed that certain components exhibit patterns that correspond to those dimensions. Gevorgyan and Porter (2008) compared Chinese and American academic websites and surveyed American and Chinese college students. The findings revealed that the participants of the study prioritized those features of web design that best reflected their native cultural backgrounds.

All the mentioned studies investigated web design using Hofstede’s cultural model, and agreed that culture has significant impacts on website design. Thence they recommended that designers incorporate cultural values into online communication and consider the culture of the user as an integral part of website promotion efforts. However, none of these studies focused on comparing the information architecture of the websites.

Information Architecture (IA) refers to the organization, labeling and structuring of information and the design of search and navigation systems in order to allow users to realize their information needs (Rosenfeld & Morville, 2002). Since IA reflects the mental models of users, a deeper understanding of cultural differences in IA can provide insight into users’ information seeking behaviors and help designers make better design decisions. We hypothesize in this paper that the mental models in American and Arab cultures are different and therefore the IAs in their academic websites are different too. Investigating this topic will inform web designers’ decisions, particularly those related to IA.

METHOD

American and Arab cultures were selected based on the rationale that those cultures are potentially very different due to history, demography, religion, language, politics, etc. Hofstede’s model of cultural dimensions was used to measure to what extent it still applies to web design from different cultures. The dimension of “Power Distance” (PD) contains most of the IA elements as detailed in Marcus’ research. Thus, we decided to limit the evaluation criteria to only those elements that correspond to PD.

Sixty top rated academic websites of two cultures – thirty representing American culture and 30 representing Arab culture – were selected from Webometrics. Webometrics is the largest academic ranking of Higher Education Institutions’ websites. Since 2004, every six months the Cybermetrics Lab updates the rankings to give information about the performance of universities from all over the world based on their web presence and impact.

To measure the differences between the information architectures of Arab and American websites a rubric was developed according to criteria developed by Marcus (2000) to measure Hofstede’s cultural dimensions. These criteria define the cultural dimensions in terms of specific features or elements of web design. According to Marcus et al. (2000), the PD dimension is characterized by mental model hierarchies (tall or shallow), a focus on expertise and authority (strong or weak), and the importance of security and restrictions to access (explicit and frequent or implicit and rare).

Since website navigation is the primary component of IA related to the PD parameter, our rubric contained the following five navigation elements:

- Homepage Navigation Hierarchy: the number of navigation levels presented on the homepage.
- Navigation Depth: the number of pages per website and the number of links available from the homepage.
- Navigation Diversity: the number of different navigation options provided.
- Hyperlink Quantity: The number of hyperlinks used throughout each website.
- Search Options: the availability of search options and the use of pagination in search results.

Our main hypothesis was that *the IA of Arab websites differs from the IA of American websites*. More specifically, given the observed PD differences between the two cultures we hypothesized that:

- The menus in the front pages of Arab websites show more levels than American Websites;
- The hierarchy of Arab websites is shallower than American websites;
- American websites offer more navigation options than Arab websites;

- There are more hyperlinks on the pages of American websites than on Arab websites;
- The search options are more consistent and diverse on American websites.

Data were collected in fall 2015; some data were collected manually and some (i.e., counts of links, number of pages, etc.) by using an automated crawler.

FINDINGS AND DISCUSSION

The sixty websites were analyzed in terms of Hofstede’s Power Distance dimension (1980) as operationalized by Marcus and Gould (2000). Only the architecture elements were captured. The analysis of the websites yielded similar conclusions to the previous studies about the impact of culture on web design. In addition, the results correlates with the finding of Hofstede’s center (2014) on power distance indicators which ranks the Arab culture 7th on the PD scale (with a score of 80) and the American culture 38th (with a score of 40).

The difference and similarities in terms of information architecture, revealed by the data, are reflected in the homepage navigation hierarchy, navigation depth, navigation diversity, hyperlink quantity, and search options.

Homepage Navigation Hierarchy: As shown in Table 1, the majority of Arab websites (14) featured three levels of navigation hierarchy or more in their homepage either through a dropdown or flat menu. For the American websites, only four out of 30 showed three levels.

	1 level	2 levels	3 levels
American	7	19	4
Arab	4	12	14

Table 1: Number of levels in the homepage menu

A chi-square test showed a statistically significant result (Chi-square=7.954, p=0.019), suggesting that the differences in navigation hierarchy are not due to chance. Thus, we conclude that there are cultural differences in terms of navigation hierarchy.

Navigation Depth: The American websites were, on average, larger than the Arab websites, but had fewer links available from their homepage. This makes the navigation of American website deeper, since there are fewer links on the homepage, and the navigation of Arab websites shallower since most sub-page links are on the homepage.

	American		Arab	
	Pages	Links	Pages	Links
Total	51,879,648	2390	3,523,864	3360
Avg.	1,729,322	79.66	117,462	112
Depth	21706.96		1048.76	

Table 2: The depth of the hierarchy by culture

To further verify this result the depth of each website was measured, then a correlation test of the depth and navigation levels was performed. The correlation result showed a very weak downhill linear relationship ($r=-0.145$), suggesting that the depth and the levels do not correlate. In other words, a deeper website is not necessarily a website with more levels showing in the front-page menu.

Navigation Diversity: The most popular menus were horizontal menus on both types of websites. Arab websites used more drop-down menus and more site maps, though a Chi-square test showed that this difference was not significant. However, from the descriptive statistics below, it seems that both groups of websites offered a diverse array of navigation options.

Nav. type	American	Arab	χ^2	Asymp. Sig.
Horizontal	28	28	.000	1.000
Vertical	18	23	1.926	.165
Tabbed	13	12	.069	.793
Drop-down	18	22	1.200	.273
Footer	27	26	.162	.688
Sitemap	8	15	3.455	.063
Tags	1	-	1.017	.313

Table 3: the navigation options provided by the Arab & US websites

Hyperlink Quantity: It was clearly noticed in the Arab websites that hyperlinks in the text were very rarely used. Even when the objective was to direct the user to another page, the link is mentioned concretely, e.g.: “See the admission’s page for more information about the admission requirements: <http://www.xyz/zyz...html>.” By contrast, the American websites used hyperlinks extensively.

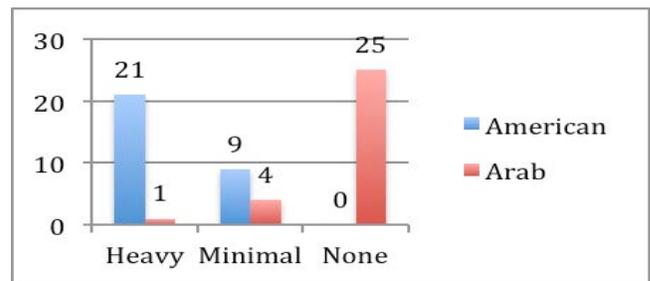


Figure 2: The use of hyperlinks in the Arab & American websites

Heavy use of hyperlinks refers to the use of 5 or more hyperlinks in 3 consistently chosen pages, minimal refers to the use of up to 4 hyperlinks. To verify the significance of this assumption, a crosstabs Lambda test was used. The Chi-square value showed that the difference did not occur by chance and the Lambda value of “> 8” confirmed the hypothesis that culture influences the use of hyperlinks.

Search Options: The results revealed that 6 of the Arab websites did not have any search box and another 6 had the search box only on some pages. By contrast, the search box in 28 of the American websites was consistently located (and all were searchable in some way). In terms of the pagination of search results, there was a consistency across the American websites, with results featuring 9 to 10 pages with options for the user to view further pages. The Arab websites had a diversified range of pages; 9 websites showed 10 pages, 6 showed 1 long page, 3 showed 4 pages and the rest showed 2 pages. A Chi-square test showed these differences were statistically significant (Chi-square=10.632, p-value=0.031). As another indicator of the differences in search options, the number of search results shown per page did not follow a pattern on the Arab websites. While 26 American websites featured 10 results per page, 15 of the Arab websites featured 10 results, 4 did not limit the number of results, and 3 allowed users to customize the number of results. It's worth noting that these variations likely stem from the choice of Content Management System and search provider (i.e., Google was used by 19 American websites but just 4 Arab websites).

In summary, we found significant differences between the IA of Arab and American websites across four of the five areas described above, confirming our hypothesis in each instance and showing that website IA is strongly influenced by cultural differences.

CONCLUSION

Since user centered designs focus on the user, understanding their mental models should be an important consideration; the organization of websites should match the users' information seeking behaviors. As we recognize those differences between cultures, taking them into consideration as part of the principle of good design is necessary. The practice of designing for "one size fits all" should be reconsidered.

This paper identified how some elements of Hofstede's model of culture manifest in website IA. Accommodating the cultural diversity of online "tourists" and turning them into "permanent residents" requires not only a good understanding of internet users' cultural backgrounds, but also an ability to incorporate or "translate" those backgrounds into specific features or elements of web design (Marcus & Baumgartner, 2004). Solutions may include creating multiple versions of websites through templates or other tools, where the website architecture and interactive features adapt to the culture of the user. However, to what extent do the Arabic websites adhere to the good standards of web design? Do the Arab websites offer a good user experience?

Gevorgyan and Porter (2008); Marcus and Hamoodi (2009); Rahim and WMI (2008) observed incompatible cases with Hofstede's scoring that may be a result of the increase of intercultural interaction or acculturation which

helped evolve perspectives of cultures towards each other. The effect of acculturation on user experience seems to be a rich issue for future research.

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