

Cross-Culture and Website Design: Cultural Movements and Settled Cultural Variables

Abdalghani Mushtaha and Olga De Troyer

Vrije Universiteit Brussel, Department of Computer Science
Research Group WISE, Pleinlaan 2, 1050 Brussels, Belgium
{abdalghani.mushtaha, Olga.DeTroyer}@vub.ac.be

Abstract. This paper reports on research carried out to determine the settled as well as other types of cultural markers including interface design elements and cultural dimensions that are appropriate to be used for cultural-centered website design and localization. For this, research discussed in this paper builds upon the existing body of research in website design and anthropologists' cultural dimensions. The research was performed in two phases: a first study was carried out to re-evaluate some pre-researched websites, and the second study was performed to evaluate and rank anthropologist's cultural dimensions. The findings of both research studies were evaluated and compared against earlier research results in order to provide insight into the evolution of the use of cultural markers. The results, a grouping of the cultural markers into 5 levels can be used for designing cultural-centered websites.

Keywords: Website localization, Cultural markers, Cross-cultural usability.

1 Introduction

The huge growth of Internet and particularly the Web has increase the emphasis on making a website usable for users and to localize it for a specific website audience. A lot of research studies have been done on the topic of localization and cross-cultural interface adaptation [9][13][17]. Most of these research studies investigated how to make a website more usable for users by localizing it for a special group of users: for a particular country, culture, or market.

Previous studies in the area of cross-cultural and website design usability [9][11][16], mostly concluded that the cultural background of a website visitor indeed has an impact on understanding and accepting a website. Moreover, many of these cross-cultural and website design studies proposed a cultural localization model based on anthropologists' cultural values.

At the Web & Information System Engineering (WISE) Laboratory, we have also done some studies aiming at verifying the relationship between websites and anthropologists' cultural dimensions [14][17]. The purpose of these studies was to determine the extent to which local web sites reflected the anthropologists' score assigned to their country for different cultural dimensions. Our research results looked inconsistent with the research findings of the other research studies. Nevertheless, our research findings highlighted some cultural values which do have an impact on the user's perception

towards understanding and accepting a website. Therefore, we decided to identify the settled as well as different types of cultural variables that are applicable for cultural-centered website design and localization.

2 Purpose of Research

A number of researchers have attempted to define a cross-culture usability model for websites through empirical research; most of the researches have based their evaluation on testing some websites [3][6][9]. Because of that, some research results are quite different from other research results, as our last research studies proved [14][17]. For this, presently, there are few settled cultural variables and there is no clear cross-culture usability model agreed upon by all researchers. This research intended to fill this gap by exploring settled as well as the different types of cultural markers, including interface design elements and cultural dimensions that are appropriate to be used for cultural-centered website design and localization.

2.1 Research Approach

In order to achieve our goal, a multi-method approach was used. We have divided the research into two main studies: cultural markers evaluation and cultural dimensions verification study.

A first study, the cultural makers evaluation, was carried out to re-evaluate some pre-researched websites. In this study, we reviewed some well-known examined websites and tried to evaluate them again against the old research results. Comparing current and earlier versions of the same website can give valuable information on cultural movements and settled cultural variables.

In a second research study, the cultural dimension verification study, nineteen (Website developer, localization, translation and internationalization experts) were asked to evaluate 16 cultural dimensions, which were investigated by anthropologists and systems designers. The aim of this study was to find out which cultural dimensions are really important for cultural-centered website design and localization, and to compare them with earlier research results.

3 Cultural Markers Evaluation

This study seeks to compare cultural markers in current and earlier versions of the same website on the Web. The websites, which were involved in this study, were websites that were involved in previous research studies [3][4][12][13][21].

3.1 Methodology for the Cultural Markers Evaluation

People from Malaysia, Greece, United Kingdom, Nederland, United States and Japan were asked to join this study to evaluate the two versions of 22 websites. We selected people from different countries because local people are better able to evaluate their local websites. Moreover, they know their own habits, cultures and are best placed to evaluate if an object is linked to their own culture or not.

Evaluation and comparison were focused on five main design components; (1) Text density, size, orientation, style and type (2) Page layout, (3) Colors, (4) Pictures, graphic elements and sound and (5) Interaction and navigation. The selection of these design elements components to be evaluated was based on previous research in cross-cultural and website design.

A scale of 1 to 5 was used in rating the extent to which a new website version was related to an old version. Here the rating scale was: 1 = not perceptible: “no difference between the two versions of the website”, 2 = hardly perceptible, 3 = perceptible to some extent, 4 = clearly perceptible and 5 = strongly perceptible: “total difference between the two versions of the website”.

3.2 Findings

This section summarizes our key findings emerging from this study. The findings from this exploratory study indicate that there is a variation in some cultural markers between current and earlier versions of the same website.

- Text on websites:

Current websites containing more text than previous website versions, with an average score of 3.3, while text availability in older website version was 2.4 (on a 1 to 5 scale).

- Page layout:

The results showed that current websites focus on design the content by means of “blocks of data”. Moreover, the data presented in current websites were in the centre of the screen and not restricted to left-aligned fixed-width layouts. Layout of the current website versions was clearly perceptible with a score of 3.7, while layout of earlier website versions was perceptible to some extent with a score of 3 (on a 1 to 5 scale). This study found that, current websites layout is totally different from the earlier website versions and the layout differences between both versions were clearly perceptible, with a score of 4.

- Colors:

Current website versions seem to use less colors to decorate the website. Using colors in current website versions were perceptible to some extent with an average score of 3.1 and 3.3 for earlier website versions (on a 1 to 5 scale).

The results show significant differences perceptible to some extent between the two categories with an average score of 3.2 (on a 1 to 5 scale).

- Pictures, graphic elements and sound:

The research found that, current website versions contain many attractive elements, and a lot of small icons to attract the visitor's attention with an average score of 3.8, while in earlier website versions, there were only a few websites with an average score of 3.1 (on a 1 to 5 scale).

There exists a perceptible sensory difference and also a similarity between samples of two websites groups; therefore, the differences between the two website versions were perceptible to some extent. The average score given for the general perceptibility rating of the extent to which new website versions related to old versions was 3.3.

- Interaction and navigation:

The average score given for general perceptibility was 4 for current websites homepages and 3.1 for earlier websites (on a 1 to 5 scale). While, the differences between two websites versions were perceptible with an average score of 3.4.

Overall, from the data and analyses presented above, it is clear that current website versions used website design component perceptible better than earlier website versions with an average score of 3.6, while earlier website versions had an average score of 3 (on a 1 to 5 scale). Moreover, the differences between the two groups of website versions were perceptible, with an average score of 3.4.

We also noticed that some cultural markers disappear and some are new, while others are still used. Therefore, we distinguish three types of cultural markers. The first type are the old cultural markers and some website design technologies, which appeared before in the old website versions disappeared in the current versions. The second type are the new cultural markers; this group contains cultural markers and website design technologies which appears in current websites and did not appear before. And the third type are the shared cultural markers; these are the stable cultural markers and website design technologies which appeared before and are still used. (The full details available with the authors)

Color is an example of a shared cultural marker. It is still a cultural oriented marker, and is still used in current website versions, while pictures are slightly more used in current website versions. It is also important to note that most of the websites have the following cultural markers: few graphic elements and more text, and the text plays a vital part in the current website versions.

Empirical research carried out by Gould [6] has shown that the website of the Universiti Utara Malaysia (www.uum.edu.my) presented and focused on authority figures and contained power symbols. In their investigation they found that, the Malaysian website contained links on the home page to website administration, pictures and symbols focusing on the country itself rather than featuring photographs of individuals. Moreover, black background, monumental buildings, top level menu selection focused on symbolism and information about the leaders of the University, which correlates well with Malaysian cultural background. By contrast, the current version of the Malaysian university website focuses on individuals. The website now contains pictures of students and teachers, the black background has disappeared, no pictures of monumental buildings anymore and the website's menu is more focused on students. But still there are some cultural markers available in the current website version. Colors, logos, social activities are some cultural markers that still appear. As an example, the current website contains a picture in the home page of a girl wearing a scarf, which is a symbol for Muslims girls.

4 Verifying Cultural Dimensions

The theoretical frameworks that have been used to guide this study are the cultural dimensions of the following anthropologists and systems designers: Nancy J. Adler [1], Edward T. Hall [10], Geert Hofstede [11], Fons Trompenaars [13], David A. Victor [19] and Quincy Wright [16]. The following cultural dimensions are used:

Human Nature Orientation [12], *Individualism vs. Collectivism* [1][10][19], *Internal vs. External Control* [1][13][19], *Time Orientation* [12], *Authority Conception* [20], *Context* [14][17][20], *Gender Roles* [10], *Power Distance* [10][17], *Uncertainty Avoidance* [10], *Universalism vs. Particularism* [19], *Achievement vs. Ascription* [19], *Affective vs. Neutral* [19], *Specific vs. Diffuse* [19], *Experience of Technology* [20], *Face-Saving* [13][20], and *International Trade and Communication* [15].

4.1 Methodology of the Study

Questionnaires were sent out to 50 experts with different backgrounds, such as: Website developer; localization, internationalization and translation experts. Responses were received from nineteen experts, who were then requested to further participate in the study. Experts who participate in this study had more than 6 years of experience in the field of user-interface design, localization or translation. The experts had different cultural backgrounds: Belgium, United Kingdom, Luxembourg, France, United States of America, Palestine, Egypt, United Arab Emirates and Jordan.

Sixteen cultural dimensions of the anthropologists and systems were presented by means of statements and cases. Every cultural dimension was explained in terms of its effects on website design. The participants were asked to indicate how much she or he agreed with the importance of the dimension as cultural dimension. The responses to these questions reflect how the participant sees the importance and the influence of every cultural dimension on cultural-centered website design and localization.

Participants were asked to read each cultural dimension details separately and then to rate it from 1 to 5, according to its importance for cultural-centered website design and localization. The rating scale was as follows: 5 = most important, 4 = important, 3 = important to some extent, 2 = not sure and 1 = not important.

4.2 Findings

Overall, the study revealed that participants were showing a clear interest in the research. Some participants agreed on the importance of some cultural dimensions in designing cultural-Centered website. Table 1 shows the ranking scores for each cultural dimension based on the marks given by experts. The column Average shows the average score given by the experts, while the columns Minimum and Maximum shows the lowest and highest score given by the participants.

The feedbacks we have gotten from this study showed that seven cultural dimensions are important and play a role when designing websites for cross-cultural audiences. They have an average score of more than 3.5 (on a 1 to 5 scale).

1. Experience of Technology

The cultural dimension “Experience of Technology” has got the highest score in this study from the experts. It refers to the attitude of certain society members towards technology. Participants were given comments such as: “It is always a challenge to make a product suitable for a specific society”, “The first thing I have to think about is what is the level of technology experience the target audience has, because it is important to understand if a target audience society is willing to use a new technology to explore new things, or use a product without complaining.”

Table 1. Cultural dimensions evaluation average rating

Dimension No.	Dimension Name	Cultural dimension ranking		
		Average	Minimum	Maximum
1	Experience of Technology	4.8	3	5
2	Context	4.7	3.5	5
3	International Trade and Communication	4.5	3	5
4	Gender Roles	4.3	2	5
5	Uncertainty Avoidance	4	2.5	4.5
6	Human Nature Orientation.	3.9	1.5	4.5
7	Power Distance	3.8	1	5
8	Time Orientation	3.4	2	4
9	Individualism vs. Collectivism	3.3	1	5
10	Authority Conception	3	1	5
11	Achievement vs. Ascription	2.8	1	4.5
12	Face-Saving	2.6	1	5
13	Specific vs. Diffuse	2.6	1.5	4
14	Affective vs. Neutral	2.4	1	5
15	Internal vs. External Control	1.8	1	4
16	Universalism vs. Particularism	1.7	1	4.5

2. Context

This cultural dimension seems to be the most important cultural dimension. All the participants agreed on the fact that amount of text, formality of website content, meaning of pictures and icons, information formality, explicit meaning or implicit information meaning of all those elements are cultural sensitive, and this cultural dimension affects website design.

3. International Trade and Communication

International Trade and Communication is a universal law rather than a cultural value. Study results showed that some countries are well aware of international standards and national trade and others do not care. For example, one of the participants noted: "The type of online payment, the level of trust and the procedure of payment should meets international standards, at the same time be compatible with user's culture background".

4. Gender Roles

Experts believe that women and men have different needs and interests in life in general, and this could affect their behaviour and interests in Websites.

5. Uncertainty Avoidance

Overall, experts recognized that it is worthwhile to understand how the target audience deals with uncertain and unexpected situations, such as: what is the reaction of the target people if the website navigation or any of design elements are not familiar to them?; Are the target audience afraid of strange and unexpected information or actions?

6. Human Nature Orientation

Study participants found that, human nature orientation gives a good indication for website localisers if the target society is able to change or not, and the degree of accepting changes. In other words, if people are accepting things which were not accepted in their own culture such as pictures, symbols, mental models, text...

7. Power Distance

Most of the participants agreed that website structure, type of messages, instructions and navigational structure are different among nations. One of the participants believes this cultural dimension is the most important one, he noted: "This is about the relationship between website owners and website visitors. For example, for this cultural dimension is important to know if website visitors are allowed to give comments or feedback on website content or not".

- Comparing our research results against earlier research results

In 2004, Aaron Marcus and his team at the AM+A studied the most practical set of culture dimensions for user interface design [12]. The following table (table 2) shows the comparison between the AM+A research results and our own research results.

Table 2. Comparing research results of the top seven important cultural dimensions

	Aaron Marcus (old research results)	Current research results
1	Context	Experience of Technology
2	Technological development	Context
3	Uncertainty avoidance	International Trade and Communication
4	Time perception	Gender Roles
5	Authority conception	Uncertainty Avoidance
6	Affective vs. neutral	Human Nature Orientation.
7	Face-saving	Power Distance

As can be seen in table 2, both research studies found that Context and Experience of Technology are the most important cultural dimensions for cultural-centered website design, followed by Uncertainty Avoidance and Power Distance. The cultural dimensions Time Perception, Affective vs. Neutral and Face-saving seem to be less important nowadays since those cultural dimensions do not appear in the current research results. Furthermore, current research results found that some cultural dimensions are now important for cultural-centered website design while they were not in the past: International Trade and Communication, Gender roles and Human Nature Orientation.

5 Discussion and Conclusion

The two research studies that we conducted have proven that some cultural markers are important for cultural-centered website design. Therefore, Web developers should be careful when a cultural-centered website design need to be developed.

- Website content, type of communication, colors and pictures are the website design elements that are mostly affected by the culture of peoples (cultural sensitive elements)

The research results emphasize the importance of the previous mentioned design elements in the design of cultural-centered websites.

5.1 Cultural Movements

It is a fact that most of the websites are changing from time to time and that is because the Web is a very dynamic environment. Nevertheless, our research found that some culture markers are still noticeable in new website versions but appear in different ways than in the past. The results of the cultural markers evaluation study showed that cultures markers are still notable in all websites examined and that the cultural differences between societies shift and change together. All people change together and therefore cultural differences remain between societies, and these differences are still perceptible in websites. Furthermore, we can state that:

- Rapid website development influence cultural shifts in websites

Due to the rapid development of web technologies and websites, there is a kind of competition between website owners to develop and keep track of new technology to highlight the content of a website in better and more appealing way and to make the website more usable. This development acceleration has induced the disappearance of some cultural markers from the past. In spite of this rapid development and its effects on website changes, some local cultural markers still appear in local websites but in another way. Another observation is:

- A culture that emerged from the use of the Web, and the local culture dominate the design of websites

Our research results of the cultural markers evaluation study and the verification of the cultural markers study found that the Web has decreased the cultural gap between Internet users. This new multicultural network creates an intercultural communication between people. Therefore, new cultural values appear and people who use the Web understand them:

- New cultural dimensions and markers became important for cultural-centered website design

Our research results show that some new cultural dimensions and cultural markers are important for cultural-centered website design. Perhaps the explanation for this is that, in the last four years, social networking sites, Wiki's, and communication tools became important and are used frequently. Furthermore, the Web transformed from a so-called "Read-only Web" to a "Read-Write Web" [5], in which content is created, shared, remixed, repurposed, and passed along. After a four year time period between the old and new research, research results still emphasize the importance and influence of anthropologists' cultural models. Our research shows a strong relation between culture and website design. All experts who participate in the second study, strongly advised to use anthropologist models for website design:

- Anthropologist cultural dimensions are still applicable for designing cultural-centered websites.

5.2 Five Levels of Cross-Cultural Markers for Cultural-Centered Website Design

It was found that, not all websites in a society fit its own cultural pattern exactly. Therefore, it is difficult to establish absolute criteria for what is important and which cultural makers are applicable for cultural-centered website design. Therefore, we have divided the cross-cultural markers that are suitable for designing cultural-centered website and localization into five levels:

1. **Context-dependent cultural markers** (e-culture): This research study reported that some cultural markers are shared between users who use the same website category. For example, people who use news website frequently have some shared semantic meaning for website elements related to news website.
2. **Settled cultural markers**: These are the website design elements and cultural dimensions which were confirmed by current and earlier research studies.
3. **Broad cultural markers**: These are the new cultural dimensions and markers that were discovered in this research study.
4. **Variable cultural markers**: These are the cultural markers and dimensions that were discovered in previous research and did not appear in this current research.
5. **Vista cultural markers**: These are all the other cultural dimensions. This type of cultural markers is identified and characterized at the national level.

Each level represents a group of related cultural markers and anthropologists' cultural dimensions, having its own sensitivity and level of importance for website localization. The first level (called the e-culture) has the highest priority level in website localization, the second priority is level 2 (the settled ones), and so on, while the least priority is the Vista level with the most cultural oriented group of markers. In this way, website developers can choose between the five levels, depending on the cultural adaptation needs formulated for the website.

The variations between the use of cultural markers in websites for the same nation are usually the result of differences in the type of website. For example university websites use cultural elements different from those used by e-commerce websites or news websites. Each website has its own identity, context, and target audience. And for that, the level of cultural adaptation may differ between websites for the same nation. Thus, the five levels identified can be used to build cultural-centered websites depending on the type of website. The relation between these five levels of cultural markers and the type of website will be explained in more details in the near future.

References

1. Adler, N.-J.: International dimensions of organizational behavior Cincinnati. South-Western/Thomson Learning, Ohio (2002)
2. Alexakis, P.: Cross-Cultural Issues in Web Development. University of Southampton (2001)
3. Aykin, N.: Usability and Internationalization of Information Technology, p. 392. Lawrence Erlbaum, New York (2005)
4. Barber, W., Badre, A.: Culturability: The Merging of Culture and Usability. In: 4th Conference on Human Factors and the Web, Basking Ridge NJ (1998)

5. Best of ReadWriteWeb, <http://www.readwriteweb.com/bestof.php>
6. Gould, E., Zakaria, N., Yusof, S.A.M.: Applying culture to website design: a comparison of Malaysian and US websites. In: 18th ACM International Conference on Computer documentation: technology & teamwork, Cambridge, Massachusetts, pp. 161–171 (2000)
7. Huang, K.H., Deng, Y.S.: Social interaction design in cultural context: A case study of a traditional social activity. *International Journal of Design* 2(2), 81–96 (2008)
8. Hofstede, G.: *Cultures and Organizations: Software of the Mind*. McGraw-Hill, London (1991)
9. Instone, I., Czerwinski, M., Mountford, S.J., Nielsen, J., Tognazzini, B.: Web Interfaces Live: What's Hot, What's Not? In: *Proceedings of ACM-CHI*, pp. 103–104 (1997)
10. Marcus, A., Baumgartner, V.: Visible Language, Special Issue Cultural Dimensions of Communication Design. Part 2 ISSN 0022-2224, pp. 252–261 (2004)
11. Marcus, A., Gould, E.W.: Cultural Dimensions and Global Web User-Interface Design: What? So What? Now What? In: 6th Conference on Human Factors and the Web in Austin, Texas (2000)
12. Mushtaha, A., De Troyer, O.: Cross-cultural understanding of content and interface in the context of E-learning systems. In: Aykin, N. (ed.) *HCI 2007. LNCS*, vol. 4559, pp. 164–173. Springer, Heidelberg (2007)
13. Quincy, W.: *The Study of International Relations*. Appleton-Century-Crofts, New York (1955)
14. Smith, A., Dunckley, L., French, T., Minocha, S., Chang, Y.: A process model for developing usable cross-cultural websites. *Interacting with Computers*. *Interacting with Computers* 16(1), 63–90 (2004)
15. Stengers, H., De Troyer, O., Baetens, M., Boers, F., Mushtaha, A.: Localization of Web Sites: Is there still a need for it? In: *International Workshop on Web Engineering (Hyper-Text 2004 Conference)*, Santa Cruz, USA (2004)
16. Sun, H.: Building a Culturally Competent Corporate Web Site: An Exploratory Study of Cultural Markers in Multilingual Web Design. In: *Proceedings of SIGDOC*, pp. 95–102. ACM Press, New York (2001)
17. Trompenaars, F.: *Riding the waves of culture, Understanding Cultural Diversity in Business*. Brealey London (1995)
18. Victor, A.: *International Business Communication*. Prentice Hall, New York (1997)
19. de Wit, F., Diehl, J.C., Arts, F.A.: How to design cultural appropriate web sites for knowledge transfer: understanding preferences. In: *IWIPS 2005: designing for global markets 7*. S.I.: P&SI, pp. 143–149 (2005)
20. Yammiyavar, P., Clemmensen, T., Kumar, J.: Influence of cultural background on non-verbal communication in a usability testing situation. *International Journal of Design* 2(2), 31–40 (2008)