

# Incorporating Culture in Website Design: A Comparison of Taiwanese and Australian Website Characteristics

Hsiu Ching Laura Hsieh\*, Chi-Hsiung Chen, and Sin Dai Hong

Department of Creative Design, National Yunlin University of Science and Technology,  
123 Section3, University Rd, Douliou, Yunlin, Taiwan 64002  
laurarun@gmail.com

**Abstract.** This paper explores issues related to user interface design and experience, including culturally preferred design elements. A local website audit was conducted to compare and analyze websites in Taiwan and Australia. The web design attributes for effective communication (usability) that are considered include: visual representation, navigation, links, layout and multimedia. Significant differences in culturally preferred design characteristics were found in each of the web design categories. Results from this study can contribute to help web developers and designers develop website designs that are culturally appropriate. Based on the methodology structure in this research, this investigation is the first phase in identifying cultural preferences of two cultures, and future research will evaluate the web experiment design to test if the cultural preferences are incorporated in the web, and to determine if such an approach can improve usability.

**Keywords:** cultural preference, usability, effective communication.

## 1 Introduction

The world has become a global marketplace. Globalization affects computer-based communication, and this is particularly obvious in web design applications, which can be accessed globally. Under the context of globalization, Hofstede [4] suggests that web developers can accommodate the diverse cultural market by applying localization as an alternative strategy to develop the global market. Google is a good example of an international company adapting their web interface design in Taiwan and Hong Kong to fit the needs of specific cultures, in order to extend their global market. In 2007, Google set up testing in the new homepage, “igoogle”, for Taiwan, Hong Kong and South Korea. The site's new design is very different, compared with Google's conventional identity of simplicity, directness, and minimalism. Google found the response of Taiwan, Hong Kong, and South Korea users to the new website designs to be quite positive. However, it raises the intriguing issue that some cultures do not react as positively as the North American and Europeans to minimalism. It implies that audiences from different cultures have different requirements, expectations,

---

\* Corresponding author.

mental models and preferences. Cultural diversity makes it impossible for designers to depend on instinctive knowledge or personal experience. Therefore, there is a need to investigate the requirements and preferences of local target-culture users.

## 2 Culture and Cultural Model

Hofstede's [5] definition of culture and Hall and Hall's cultural theories [6] are applied in this paper. Hofstede [5] states that everyone carries this/her own patterns of thinking, feeling and behavior which are accumulated during their lifetime. These patterns are mostly accumulated during childhood and define the ways of feeling, thinking and mental programming; these vary as much as the social environments in which they were acquired. Hofstede examined IBM employees in 53 countries from 1978 to 1983 and defined patterns of differences and similarities among the replies of employees through statistical analysis of a variety of data. The five dimension culture theory was thus formulated from the results of an analysis of the data. The five cultural dimensions are introduced as follows:

**Power Distance:** This refers to the extent to which less powerful members of society expect and accept unequal power distribution within that society. Countries with higher power distance cultures have features such as hierarchical structures in organizations, with the relationships between superiors and subordinates being stricter than in countries with low power distance. Low power distance cultures have characteristics such as more equal relationships between superiors and subordinates, and a flatter structure of organization [5] [7].

**Individualism vs. Collectivism:** Individualism in culture implies loose ties where all are inclined to take care of themselves or their nuclear family, and usually tend to be independent of other people. A collectivist culture tends to value group welfare more than the individual's, and believes in group relationship, where loyalty is the dominant factor. Individualistic countries value the individual's accomplishments while collectivistic countries emphasize the benefits of working in a group [5] [7].

**Masculinity vs. Femininity:** This refers to gender roles within a culture. Countries with strong masculine cultures tend to emphasize challenge, social recognition and the pursuit of welfare. On the contrary, countries with less defined masculine cultures tend to collapse gender distinction and overlap gender role, and emphasize security, care of others, and the environment [5] [7].

**Uncertainty Avoidance:** This refers to the extent to which people want to avoid uncertain conditions. People with low uncertainty avoidance cultures are more comfortable with uncertain situations. On the other hand, people from cultures with higher uncertainty avoidance tend to prefer rules and reject change since uncertainty may result in anxiety [5] [7].

**Long-Term Orientation vs. Short-Term Orientation:** Long-term orientation plays an important part in Asian countries that have been influenced by Confucianism. People from these countries believe strongly that an unequal relationship is required to keep a society stable. A clearly defined hierarchical relationship is needed to keep

family and society in harmony. Virtuous behavior is identified by hard work and perseverance. On the contrary, cultures with short-term orientation have opposite attributes [5] [7]. According to Hall and Hall [6], “A high context communication or message is one in which most of the information is already in the person, while very little is in the coded, explicit, transmitted part of the message. A low context communication is just the opposite”. The attributes reflected in high and low context cultures are introduced as follows.

**Thought Pattern:** People from a high context culture tend to use an implicit approach in their communication, rather than stating the subject directly. People from a low context culture tend to achieve their aims directly by applying logical straightforward communication [6] [7].

**Polychronic & Monochronic Time Perception:** People from high context cultures tend to be polychronic in time perception and think that everything will happen when the right time comes, while people from low context cultures tend to be monochronic in time perception and believe in carrying out a job on time [6] [7].

**Communication Pattern;** People from high context cultures countries tend to have more confidence in their non-verbal communication, while people from low context cultures are inclined to express their thinking by content and oral language [6] [7].

**Indirectness;** People from high context cultures tend to use harmonious ways to communicate, while people from low context cultures tend to express meaning in a straightforward way [6] [7].

### 3 Culturability

Barber & Badre [1] use the word “culturability” which combines the two words “usability” and “culture”. They constructed a cultural marker approach which is a kind of systematic usability method to examine hundreds of websites, and then defined cultural markers such as colors, fonts, icons, metaphors, geography, sounds, motions, flags, language, preferences for text and graphics, directionality of how language is written, help features and navigation tools in order to facilitate users’ performance.

Sun [12] examined how cultural markers (cultural preferences) affect web usability by interviewing target culture people about their experiences; she concluded that people prefer interaction interface with cultural markers from their own cultures; she found that the usability of the web can be strengthened by cultural markers. Based on Baber and Badre’s cultural marker approach, Smith et al. [11] found the culturally preferred design elements in Taiwanese and Indian cultures, and defined these design elements as cultural attractors. These cultural attractors are the interface design attributes of the websites which reflect their denotations matching the expectations of the local culture. Cultural design preferences can map directly into culturally appropriately design elements for a website, but are usually inclined to be stereotypical. If the cultural design preferences are applied successfully in a website, they can markedly increase the usability of a websites and thus address the needs of the target culture

audience. As Sun has stated, if a company knows what type of cultural markers can be used for a particular culture, exhaustive studies will be saved.

## 4 Web Attributes for Effective Communication

According to Smart et al. [10], it is essential to identify several categories ( i.e., typography, site structure and cognitive design, medium use, message content, appeal, accessibility) of web design characteristics that are vital in helping the designers convey desired meaning and making it easier for users to obtain the intended meaning. Based on the aim and requirement of this research, the key components of web for effective communication are illustrated as below.

**Visual Presentation:** This includes images, photos, symbols, icons and graphics. The attributes of visual representation can efficiently transmit a message to the viewer in an attracting manner. Russo & Boor [9] state that images are the visual language of a culture and they are similar to words; thus images do not always translate. The images, symbols and icons we recognize in our culture may have no meaning or even contrary signification in another culture.

**Navigation:** This refers to different kinds of navigational tools, menu formats, links, and search capabilities. Users may get lost when moving in a website without a precise and assisted way for attaining information. Marcus & Gould [8] declare that culture influences the navigation in web design. Audiences from cultures with a high uncertainty dimension tend to prefer a navigation structure intended to prevent them from getting lost, while cultures with a low uncertainty dimension are inclined to prefer less control in navigation.

**Links:** In other works by Sun, she investigated users from America, Germany, China and Brazil with regard to their design preferences, and found that different preferences existed. It was discovered that the German audience prefers links in the navigation bar, which can be set up in alphabetical order, but that this preference is not favored by Chinese and Brazilian users. Based on the above literature review, it can be seen that preferences for links differ across cultures.

**Layout:** This is the display structure that directs scanning information and reflects the orderly flow of tasks. If the layout is properly designed, it makes it easier for the viewer to access information and comprehend the information within a contextual and structural model, facilitating the communication between the user and the system [13]. According to Barber & Badre's study [1], users from different cultural backgrounds have different preferences for orientation and layout structure in web pages.

**Multimedia:** This refers to sounds, animation, moving text and streaming video. If the multimedia can be used properly, it can enrich the experience of the user. Integrating multimedia into web interface design can be a very powerful means for transmitting information beyond that of text, visual representations, still images and pictures; it may also prove to be an effective means to mislead and distract the audience [2].

Not all audiences expect or prefer the use of multimedia. This depends on the cultural background of the users.

Based on the above research related to cultures and web interface design attributes, it can be assumed that web design preferences for visual presentation, navigation, links, layout and multimedia differ across cultures. Five hypotheses are formulated as follows;

Hypothesis 1: Preferences for visual presentation vary between Taiwanese and Australian users.

Hypothesis 2: Preferences for Navigation vary between Taiwanese and Australian users.

Hypothesis 3: Preferences for Links vary between Taiwanese and Australian users.

Hypothesis 4: Preferences for Layout vary between Taiwanese and Australian users.

Hypothesis 5: Preferences for Multimedia vary between Taiwanese and Australian users.

## 5 Methodology

The cultural categories used in this study are based on national culture and are operationalized using websites from Taiwan and Australia. Taiwan and Australia are selected because they possess distinctly different cultural attributes, as based on Hofstede’s country cultural dimensions [5] as presented in Table 1.

**Table 1.** Hofstede’s country cultural dimensions

Cultural dimension	Power Distance		Individualism & Collectivism		Masculinity& Femininity		Uncertain Avoidance		Long term & short term time orientation	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Australia	41	36	2	90	16	61	37	51	15	31
Taiwan	29/30	58	44	17	32/33	45	26	69	3	87

Based on Table 1, Australia is ranked 41, while Taiwan is ranked 29/30 in power distance among 53 countries; Australia is ranked 2nd, and Taiwan 44th in individualism vs. collectivism; Australia is ranked 16, and Taiwan 32/33 in masculinity vs. femininity; Australia is ranked 37, and Taiwan 26th in uncertain avoidance; and finally, Australia is ranked 15th, and Taiwan 3rd in long-term orientation vs. short-term orientation.

### 5.1 Local Government and City Website Selection for Audit

Government websites were chosen for audit in this study. Local county and city government sites offer sufficient sample sizes for each country and this type of website was selected to avoid the influence of corporate branding or company images. It was expected that the websites chosen in this study would be less influenced by external designers or other cultures.

## 5.2 Stages of Procedure in the Audit of Local Websites

The first stage was to use focus groups to define five aspects of interface design. Members of the focus groups had many years of experience in the areas of web design, localization, computer science and international culture, and were able to discuss the previous research related to localization and design characteristics to identify website characteristics that could be easily compared and assessed by researchers. The focus groups determined five categories of website characteristics in this research: visual presentation, navigation, links, layout and multimedia.

The second stage was to concentrate on designing an instrument to evaluate website characteristics based on initial results from the focus groups. All the categories and specific attributes that were identified by the focus groups were incorporated into a questionnaire. Each characteristic was given 0 (not present) or 1 (present) for categorical questions. For example, if the homepage of the sites had a search feature, the expert would add a 1 for that categorical variable.

For the third stage, two design experts were invited to be evaluators in the local web audit, one, a Taiwanese, undertaking a PhD in HCI research at Chungking University with 5 years' experience at a website design company in Taipei and the other an Australian, an interface designer in a multimedia company for 8 years in Taichung City. Each expert reviewed thirty local government web homepages from his own country, providing ratings by nations. The analysis tool, SPSS, was applied to perform cross-tabulation comparisons to check whether there were significant differences between the two cultures in each category. The results of all categories of variables are presented in Tables 2 to 6.

## 6 Results

The results of all categories of variables are presented in Tables 2 to 6. In each variable, the actual counts are presented, and the number of the site that has the variable present is noted.

**Table 2.** Visual representation

Variable	Actual count		Expected count	Chi-square	Degrees of freedom	Sig. Level
	Taiwan	Australia				
Iconic symbols	19	5	12	13.611	1	.000
Government identity symbols	27	29	28	1.071	1	.301
Images of leader	22	6	14	17.143	1	.000
Photo of Accomplishment	17	2	9.5	17.330	1	.000
Images of group	14	4	9	7.937	1	.005
Images of daily life	0	17	8.5	23.721	1	.000
Images of Animal/Plant	3	7	5	1.920	1	.166
Images of landscape	12	6	9	2.857	1	.091
Cute style illustration	15	2	8.5	13.871	1	.000
Banner within color shape	2	12	7	9.317	1	.002
Banner within local city image	25	13	19	10.335	1	.001

Hypothesis 1 was supported. As demonstrated in Table 2, there were eight significant preferences for visual representation variables across both cultures. Iconic symbols were found in many more of the Taiwanese websites. Iconic symbols are used almost four times as much in Taiwan as in Australia. The images of leader feature were found in 70% of Taiwanese websites, but in only 25% of Australian websites. Photo of accomplishment is used eight times as much in Taiwan as in Australia. Taiwanese websites show a much higher occurrence of images of groups than do those of Australian sites. None of the Taiwanese websites had images of daily life, while such images were present in nearly 60% of Australian websites. The cute style illustrations are highly popular in Taiwanese local government websites, with half of Taiwanese websites utilizing this. Only 2 Australian websites used this. Only 2 Taiwanese websites had banner within color shape, while 40% of websites in Australian did. Taiwanese have a strong preference for banner within local city image; 25 Taiwanese websites had banner within local city image, while this was true of less than a half of Australian websites.

**Table 3.** Navigation

Variable	Actual count		Expected count	Chi-square	Degrees of freedom	Sig. Level
	Taiwan	Australia				
Horizontal menu	27	28	27.5	.218	1	.640
Vertical menu	28	24	26	2.308	1	.129
Return to home button	27	24	25.5	1.176	1	.278
Search	20	27	23.5	4.812	1	.028
Accessibility icon	26	3	14.5	35.306	1	.000
Accessibility on text	0	11	5.5	13.469	1	.000

There is support for Hypothesis 2. An analysis of the results from Table 3 yields the following observations. There are three significant differences between Taiwanese and Australian cultures. Specifically, more than 80% of Taiwanese websites have accessibility icons, while only 10% of Australian websites have these. No Taiwanese websites have accessibility on text, while nearly 40% of Australian websites have this feature. Search functions occur frequently on Taiwanese and Australian sites: 90% of Australian websites have this attribute, and it is also found on 67% of Taiwanese websites.

**Table 4.** Links

Variable	Actual count		Expected count	Chi-square	Degrees of freedom	Sig. Level
	Taiwan	Australia				
Popup a new window	16	2	9	15.556	1	.000
Dynamic button	12	1	6.5	11.882	1	.001
Color change	25	23	24	.417	1	.519
Mouse over (underlined)	8	22	15	13.067	1	.000

Hypothesis 3 was also supported for diverse preferences links. Based on Table 4, link characteristics differ significantly across the two cultures. “Popup a new window” is used eight times as much in Taiwanese websites as in Australian websites. 12 of the Taiwanese websites had a dynamic button, whilst only one Australian website had this. Color change is widely highly used in both cultures. The mouse over (underlined) characteristic is used nearly three times as much in Australia as in Taiwan.

**Table 5.** Layout

Variable	Actual count		Expected count	Chi-square	Degrees of freedom	Sig. Level
	Taiwan	Australia				
Single-column	0	2	1	2.069	1	.150
Two-column	8	18	13	6.787	1	.009
Three-column	22	10	16	9.643	1	.002
Vertical menu on left	19	12	15.5	3.270	1	.071
Vertical menu on right	7	12	9.5	1.926	1	.165
Flexible width design	1	15	8	16.675	1	.000
Horizontal menu on top	1	12	16.5	5.455	1	.020
Information guide on bottom	3	11	7	5.963	1	.015

In support of Hypothesis 4, layout preferences vary between Taiwan and Australia. Two-column, three-column, flexible width design, horizontal menu on top and information guide on bottom differ across cultures. Only 27% of Taiwan websites had two-column, while 60% of Australian websites had this. Three-column is found in many more Taiwanese websites. More than 70% of the studied Taiwanese sites had this, while this applied to only 33% of the Australian websites. Flexible width design is exhibited in many more Australian websites. Only 3% of Taiwanese websites had this, compared to 50% of Australian websites. Only one Taiwanese website had horizontal menu on top, while 40% of Australian websites had this. Of Taiwanese websites only 10% had information guide at the bottom, while 37% of Australian websites had this.

**Table 6.** Multimedia

Variable	Actual count		Expected count	Chi-square	Degrees of freedom	Sig. Level
	Taiwan	Australia				
Sound	3	0	1.5	3.158	1	.076
Stream video	16	3	9.5	13.017	1	.000
Flash animation	16	1	8.5	18.468	1	.000
Moving picture	23	1	12	33.611	1	.000
Moving text	10	0	5	12.000	1	.001
Opening	10	0	5	12.000	1	.001



Hypothesis 5 was strongly supported. Results in Table 6 lend strong support to the fact that multimedia characteristics differ across the two cultures; Multimedia are used to a greater extent in Taiwan than in Australia. Preference differences for stream video, flash animation, moving picture, moving text and opening were statistically significant between the two cultures. Specifically, over 80% of Taiwan sites used moving picture and over 60% of Taiwan websites used stream video and flash animation. As far as Australian sites were concerned, only 3 websites had stream video and only 1 website had flash animation. None of the thirty Australian websites had moving text and opening, while 30% of Taiwanese websites had both of these characteristics. The use of sound did not differ significantly across cultures and this attribute was seldom used in two cultures.

## 7 Discussion

This research contributes to studies related to the web design characteristics and hence preferences which are popular in Taiwan and Australia. Results of this study reveal that there are significant websites design differences between the two cultures.

Most hypotheses lend support for Würtz's [14], Sun's [12], Marcus & Gould's [8] premises that web designers need to adapt interface attributes for culturally diverse users. Various preferences exist between Taiwan and Australia users. Particularly, most Taiwan sites use moving picture, stream video and flash animation in websites, while few Australian websites incorporate stream video and flash animation. It shows that Taiwanese culture greatly prefers using multimedia in websites, whereas Australian culture prefers static text and pictures. One possible explanation for this difference is that Taiwan is considered a high-context culture, while Australia is considered a very low-context culture. High context cultures (i.e., Taiwan) will seek to assimilate human presence on their websites, and flash animation and text in motion have the potential to provide this. On the contrary, low context cultures prefer direct, explicit communication patterns, quickly getting results and reaching goals. Flash animation or text in motion would lead to distraction for low context cultures (i.e., Australia).

There is evidence of different preferences for layout and links between Taiwan and Australia, Taiwanese culture greatly prefer three-column, popup a new window, dynamic button while the Australian culture tends to use mouse over (underlined) and two-column layout. One possibility for the cultural difference is that Taiwan culture with long-term time orientation tends to be patient in attaining results and reaching goals. In Australian culture, with short-term time orientation, there is the desire to quickly get results and reach goals. There also exist differences in visual representation between the two cultures. Culture with collectivism (i.e., Taiwan) have preferences for images of a leader, photo of an accomplishment and images of a group. Australians, with their emphasis on individualism, are inclined to take care of themselves, enjoying their lives, and usually remaining independent of other people tend to prefer images of daily life. The result also echo Marcus and Gould's [8]. It is surprising that Taiwanese sites use cute style illustration a lot and that kind of style is not consistent with the identity of a city government.

## 8 Conclusions and Future Work

This research has the potential to help web developers and designers to develop a web interface design that is culturally appropriate. In sum, this research provides statistically significant evidence to support that web design preferences vary across cultures. This finding supports the importance for the localization of web design and provides some directions related to specific cultural preferences. The implication of this investigation formulates the following questions: “Since different cultural preferences for web design characteristics exist, how can the culturally preferred design characteristics be applied to increase usability?” and “Do users perform better in websites which incorporate culturally preferred design characteristics?”

The results of this study would be applied to a web experiment, which could be conducted to test the next related hypothesis: “If these cultural differences are incorporated in web design, they can improve web usability and facilitate effective communication.” Based on the differences in culturally preferred design characteristics, subsequent research could evaluate web usability with such characteristics embedded into the interface of a web prototype.

**Acknowledgement.** The authors gratefully acknowledge the support for this research provided by National Science Council of Taiwan under grants no. NSC 101-2410-H-224-025-.

## References

1. Barber, W., Bardre, A.: *Culturability: The Merging of Culture and Usability*. In: *Proceedings of the 4th Conference on Human Factors and Usability* (1998), <http://zing.ncsl.nist.gov/hfweb/att4/proceedings/barber>
2. Brinck, T., Gergle, D., Wood, S.D.: *Designing Web sites that work: usability for the Web*. Morgan Kaufmann Publishers, San Francisco (2002)
3. Cyr, D., Trevor-Smiths, H.: *Localization of Web design: An empirical comparison of German, Japanese, and United States Web site characteristics*. *Journal of the American Society for Information Science and Technology* 55(13), 1199–1208 (2004)
4. Hofstede, N.: *Global Issues, local Concerns*. *Technical Communication*, Second Quarter, 145–148 (1999)
5. Hofstede, G.: *Cultures and Organizations: Software of the Mind*. McGraw-Hill, London (2005)
6. Hall, E., Hall, M.: *Understanding cultural differences*. Intercultural Press, London (1990)
7. Hsieh, H.C., Holland, R., Young, M.: *A Theoretical Model for Cross-Cultural Web Design*. In: Kurosu, M. (ed.) *HCD 2009*. LNCS, vol. 5619, pp. 712–721. Springer, Heidelberg (2009)
8. Marcus, A., Gould, E.W.: *Cultural Dimensions and Global Web User-Interface Design*. *Interactions*, 33–46 (July/August 2000)
9. Russo, P., Boor, S.: *How fluent is your interface? Designing for international users*. *Human Factors and Computer Systems*. In: *Proceedings of 4th Conference on Human Factors in Computing Systems*, pp. 342–347. Addison-Wesley, Boston (1993)

10. Smart, K.L., Rice, J.C., Wood, L.E.: Meeting the Needs of Users: Toward a Semiotics of the Web Technology & Teamwork. *IEEE*, 593–605 (2000)
11. Smith, A., Dunckley, L., French, T., Minocha, S., Chang, Y.: A process model for developing usable cross-cultural websites. *Interacting with Computers* 16(1), 63–91 (2004)
12. Sun, H.: Building a culturally-competent corporate web site: an exploratory study of cultural markers in multilingual web design. In: *Proceedings of the 19th Annual International Conference on Computer Documentation*, pp. 95–102 (2001)
13. Yu, B., Roh, S.: The effects of menu design on information-seeking performance and user's attitude on the Web. *Journal of the American Society for Information Science and Technology* 53(11), 923–933 (2002)
14. Würtz, E.: A cross-cultural analysis of websites from high-context cultures and low context cultures. *Journal of Computer-Mediated Communication* 11(1), article 13 (2005), <http://jcmc.indiana.edu/vol11/issue1/wuertz.html>