Measuring the Effects of Cultures on Website Use

Hsiu Ching and Laura Hsieh

Departmet of Creative Design
National Yunlin University of Science and Technology
123 Section3, University Rd, Douliou, Yunlin, Taiwan 64002

ABSTRACT

Under the context of globalization, it is essential to understand the cultural requirements and preferences of a target culture if a company wants to develop a website which can appropriately map that target culture. Based on the author's previous study, the culturally preferred characteristics between Taiwan and the UK have been found (Hsieh and Hong, 2013). The previous finding of the culturally preferred characteristics between Taiwan and the UK formulates the further questions: "Since different cultural preferences for web design attributes exist, how can the culturally preferred design characteristics be applied to increase usability?" Therefore, the aim of this paper is to measure the effect of cultural preferences on the use of web design. The methodologies are introduced as following. First, two cultures are selected. Taiwan and the UK are selected. Second, experimental webs are constructed. The cultural preferences for websites of Taiwan and the UK would be embedded into websites prototype, which have the same content. Finally, applying SPSS to analyze the data of the usability testing. Based on the results of the analyasis and discussion, it reveals that culturally preferred design elements of the target-culture can improve the effectiveness of web communication for the users from the target-culture. This research can help web developers and designers to develop a web interface design that is culturally appropriate.

Keywords: globalization , web design attributes, cultural preferences, usability

INTRODUCTION

In the past, web developments were aligned with cognition theory and computer technology. Marcus and Gould (2000) pointed out that web designers need to do much planning, research, analysis, design, evaluation, documentation, and training to deeply comprehend the requirements of the users, markets, and businesses. Cultural diversity makes it impossible for designers depending on the instinctive knowledge or personal experiences. Under the context of globalization, Hofstede (2005) suggested that web developers could accommodate diverse cultural markets by applying localization as an alternative strategy to developing the global market. Therefore, there is a need to investigate the requirements and preferences of target-culture users. Based on the results of local website auditing in the previous research of Hsieh and Hong (2013), there are significantly different preferences for web interface design between Taiwanese and the UK cultures. Furthermore, it is questioned whether those cultural differences could be applied to improve web usability. Therefore, this research is to evaluate the effects of cultural preferences on website use.

LITERATURE REVIEW

The Meaning of Culture and Cultural Model

Trompennaars and Hampden-Turner (1997) defined culture as the way in which people in a specific area sorted out the problems and reconciled dilemmas. Furthermore, Sheriden (2003) defined culture as the means how people from certain cultural background saw and interpreted specific images and information, in terms of web globalization. Evers (2002) defined culture as formulating the way to view the world, behave themselves, express themselves and think. It was accumulated by historical experiences, value, tradition, and environments. All of the above studies suggested that the world was understood by people based on the context of culture. The way of people's behaviors, comprehension, expression and interaction was accumulated by culture. Hofstede's cultural theory is applied in this research. Referring to Hofstede's (2005) definition of culture, in which personal patterns of thinking, feeling and behaviors were accumulated in the lifetime from the childhood and the ways of feeling, thinking, and mental programming would vary the received social environments. From the investigation of IBM employees in 53 countries from 1978 to 1983, Hofstede defined the patterns of differences and similarities among the responses of employees and proposed five dimensions for the culture theory, introduced as the follows.

Uncertainty Avoidance. This refers to the degree to which people are comfortable with uncertain conditions. People from cultures with low uncertainty avoidance are more comfortable with uncertain situation. Countries (e.g., Japan, China, and Taiwan) with high uncertainty avoidance tend to be expressive, speaking with gestures and showing their emotions. People are inclined to be aggressive, emotional to stay away from ambiguous conditions, and keep an orderly structure in an organisation or society. On the other hand, people from cultures with low uncertainty avoidance (e.g., the USA and UK) tend to be less expressive, less openly anxious and people act without strongly showing their emotions.

Power Distance. This refers to the extent to which less powerful members expect and accept unequal power distribution within a culture. Cultures with high Power Distance (e.g., Malaysia and Mexico) have characterized hierarchies in organization and autocratic leadership. For example, leaders with a certain level of dictatorship, such as teachers and parents, are highly respected. Students are expected to show their respect to teachers and children have to be filial to parents. On the contrary, cultures with low Power Distance (e.g., Austria and New Zealand) tend to have characteristics such as more equal relationships between leaders and subordinates, and subordinates are more able to express their thoughts and participate in managerial decisions. Teachers and students, and parents and children regard themselves as equal relations.

Individualism vs. Collectivism. This refers to the extent to which the individuals incorporate with the group. Collectivist cultures emphasise the benefits of working in a social group. Collectivist cultures value training, skills, and physical condition, and they value harmony more than truth in family relations, using shame to achieve goals and to save face. On the other hand, individualistic cultures value personal time, freedom and truth in their family relations, and pursue the goals by guilt (Marcus and Gould, 2000). Collectivist cultures (e.g., Taiwan and China) tend to prioritize group welfare over the individual's target where the achievement of an individual is not regarded as important as the accomplishment of the group, and believe in group relationship where loyalty is dominant. Individualistic cultures (i.e. USA, Australia) are inclined to lose ties, where everyone is expected to look after themselves and their nuclear family, and are usually inclined to be independent of other people.

Long-Term Orientation vs. Short-Term Orientation. Long-term orientation presented a critical part in Asian countries influenced by Confucianism that people from such countries strongly believed in the necessity of an unequal relationship for the stability of a society. The harmony between family and society was clearly defined in the hierarchical relationship, and virtuous behaviors were identified by hard work and perseverance. On the contrary, cultures with short-term orientation revealed opposite attributes (Marcus and Gould, 2000；Hofstede, 2005).

Masculinity vs. Femininity, referring to gender roles in a culture. Countries with strong masculine cultures tended to concentrating on challenge, social recognition, and the pursuit of welfare. On the contrary, countries with less defined masculine cultures tended to collapsing gender distinction, overlapping gender roles, and emphasizing security, care of others, and the environment (Marcus and Gould, 2000；Hofstede, 2005).

The Impact of Cultures on Web Usability

Barber and Badre (1998) constructed a cultural marker approach as a kind of systematic usability method to examine hundreds of websites and defined cultural markers, such as icons, colors, metaphors, fonts, geography, sounds, motions, flags, language, preferences for text and graphics, directionality of written language, help features, and navigation tools, in order to facilitate the user's performance. Based on Baber and Badres' cultural marker approach(1998), Smith et al. (2004) figured out the culturally preferred design elements in Taiwanese and Indian cultures and defined such design elements as cultural attractors, which were the interface design attributes of the websites, reflecting their denotations matching the expectations of the local culture. Cultural design preferences could directly map into culturally appropriate design elements for a website, but were usually inclined to the stereotype. When the cultural design preferences were successfully applied to a website, they could markedly increase the usability of websites and thus address the needs of the target culture audience. As Sun (2001)mentioned, exhaustive studies could be reduced when a company realized the type of cultural preferences being used for a specific culture.

Web Components for Effective Communication

Smart et al. (2000) stated that it was necessary to identify several vital categories of web design characteristics for helping the designers convey desired meaning and the users more easily obtain the intended meaning. In this research, integrating the studies of web interface design elements from Sun (2001), Russo and Boor (1993), and Smart et al. (2000)and modifying them, the web element which would influence the web communication are defined visual representation, navigation, layout, link, and multimedia,. The detailed introduction of them is shown as below.

1) Links. Sun (2001) investigated the users from America, Germany, China and Brazil with regard to their design preferences and found the existence of different preferences. It was found that the German users preferred to the links in the navigation bar, which could be set up in alphabetical order; but, such preference was not favored by Chinese and Brazilian users.

2) Visual Presentation, including images, pictures, symbols, icons and graphics. The characteristics of visual representation can efficiently convey a message to the audience in an attracting manner. Russo and Boor (1993) state that the images, symbols, icons we recognize in our culture may have no meaning in another culture. To be succeful in the global market, images must be carefully chosen and designed. Designers must sufficiently comprehend that difference among cultures to recognize images that are culturally specific.

3) Layout. This is the display structure that directs scanning information and reflects the orderly flow of tasks. It includes categories of grouping, menu placement, search functions, and orientation. It has been an important part on information retrieval system research. If the layout is properly designed, it can easier for the viewer to access information, comprehend the information within a contextual and structural model, and facilitate the communication between the user and the system (Yu and Roh, 2002).

4) Navigation. This refers to different kinds of navigational tools, menu formats, different kinds of links, and search capabilities. Marcus and Gould (2000) declared the influences of culture on the navigation in web design. Users from cultures with a high uncertainty dimension tending to a navigation structure intended to prevent them from getting lost, while cultures with a low uncertainty dimension inclined to less control of navigation.

5) Multimedia. In web communication, the usage of multimedia in the Internet plays a significant role. Web multimedia refers to sounds, animation, moving text, and streaming video. If the multimedia can be used properly, it can enrich the experience of the user. In Web design, text and graphics can be kinetic (i.e., flash animation, gif animation), and moving text can add emphasis in a page. 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, if it is incorporated into the web appropriately. Multimedia can be used for increasing comprehension or facilitating understanding for users and enhancing the user experience. Multimedia is also an effective means to mislead, distract, and aggravate the audience (Brinck et al., 2002).

METHODOLOGIES

The methodologies in this research are introduced in this section. First, two cultures are selected. Second, hypotheses are constructed. Third, the experimental websites are constructed. Fourth, the usability test is established.

Two cultures are selected

The cultural categories used in this study are based on national culture and operationalized with websites from Taiwan and the UK that possess different cultural attributes, based on Hofstede's country cultural dimensions (2005). The UK is ranked 42/44, while Taiwan is ranked 29/30 in power distance among 53 countries; the UK is ranked 3rd, and Taiwan 44th in collectivism; the UK is ranked 9/10, and Taiwan 32/33 in. femininity; the UK is ranked 47/48, and Taiwan 26th in uncertain avoidance; and finally, the UK is ranked 18th, and Taiwan 3rd in long-term orientation.

Hypotheses

In the author's previous research **(**Hsieh and Hong, 2013**)**, where local website auditing was constructed, it is found that there are significantly different preferences for web interface design between Taiwanese and the UK cultures (Table 1 and Table 2). Further, the hypotheses are proposed - if the websites are embedded with culturally preferred characteristics and incorporated with their cultural dimensions, they can be more effective in communications. To testify the hypotheses, the web experiment is constructed. In the website experiment, the culturally preferred design elements are embedded in websites and the communication effectiveness (usability) would be evaluated from five aspects including learnability, efficiency, minimal errors, comprehension, and satisfaction. The details of the hypotheses are shown as below.

1. If the Nantou government website is embedded with culturally preferred design elements that reflect Taiwanese culture, it can be more effective in the communication for Taiwanese users.

2. If the Nantou government website is embedded with culturally preferred design elements that reflect Australian culture, it can be more effective in the communication for Australian users.

Table 1 Significant Taiwanese culturally preferred attributes (Hsieh and Hong, 2013)

Variables	Components
Visual representation	Iconic symbols
	Images of leader
	Photo of accomplishment
	Images of group
	Cute style illustration
	Photo of landscape
	Banner within local city image
Navigation	Accessibility icon
Links	Popup a new window
	Dynamic button
	Mouse over (color change)
Layout	Three-column
Multimedia	Stream video
	Flash animation
	Moving picture
	Moving text
	Opening

Table 2 Significant Australian culturally preferred attributes (Hsieh and Hong, 2013)

Variables	Components

Visual representation	Images of daily life
	Banner within color shape
Navigation	Search
	Accessibility on text
Links	Mouse over underlined
	Stay in the same window
Layout	Two-column
	Flexible width design
	Information. guide on bottom

Four experimental websites being constructed

Based on the hypotheses and integrated with the results of the local websites audit, the culturally preferred features are embedded into four websites, which have the same content from Nantou county government in Taiwan, the Chinese version of Nantou government website reflecting Taiwanese culture, the English version of Nantou government website reflecting Taiwanese culture, the Chinese version of Nantou government website reflecting the UK culture, and the English version of Nantou government website reflecting the UK culture .

Evaluation criteria for usability test

Based on Nielsen (1993), four evaluation criteria are interpreted as the following. 1) Efficiency can be the assessment of the time needed for carrying out a task. The process of more rapidly executing a task implies the greater efficiency. 2) Learnability points out the easiness to learn the system. 3) Minimal errors indicate the evaluation criteria of errors being defined as users making as few errors as possible when using the system. 4) Satisfaction refers to the extent of the users preferring the system. 5) Comprehension: It is easy to understand and readable.

CONSTRUCTION OF WEB EXPERIMENTAL AND USABILITY TEST

Participants and experiment procedure

Fifteen UK participants were recruited in this experiment, and these participants were native English speakers, averagely aged 30 years old, stayed in Taiwan less than 3 months, taught English, and were born and brought up in the UK. Taiwanese participants were native Chinese speakers, the PhD and Master students from National Yunlin University of Science and Technology, and aged 30 years old averagely. Each participant was invited to Laboratory DA405 in National Yunlin University of Science and Technology to participate in the web experiment. The Taiwanese participants were asked to carry out the tasks assigned on Chinese version of Nantou website embedded with Taiwanese preferences and Chinese version of Nantou website embedded with the UK preferences, and the UK participants were asked to carry out the tasks assigned on English version of Nantou website embedded with Taiwanese preferences and English version of Nantou website embedded with the UK preferences according to the instruction and task assigned. When the participants executed the tasks, they interacted and navigated with the websites, during which the time and clicks for carrying out each task were captured and recorded. Finally, the usability questionnaires were used for their responses, subjective opinions, and satisfaction from the participants.

Task assigned

Using Spool et al.'s method (1999), the questions were designed so that the answer comprised a single fact and only one correct answer. Four sets of tasks were constructed for each website. The tasks were equivalent for the Nantou website which was embedded with Taiwanese culturally preferred attributes and the Nantou website which was embedded with the UK culturally preferred attributes. Taiwanese participants needed to locate requested pages on

the Nantou website which reflect Taiwanese culture and the Nantou website which reflect the UK culture, and the UK participants needed to locate requested pages on the Nantou website which reflect Taiwanese culture and the Nantou website which reflect the UK culture.

Table 3 Task assigned for Taiwanese and the UK participant

	The Chinese and English version Nantou web reflecting Taiwanese culture	The Chinese and English version Nantou web reflecting the UK culture
Task01	When is the Beauty Leg Princess Election in Nantou held and write it down?	Where is the Beauty Leg Princess Election in Nantou held and write it down?
Task02	Can you find out Government Ethics Bureau's free call for prosecution and write it down?	Can you find out Government Administrative Bureau's call and write it down?.
Task03	When is the Job Fair held by Nanto County Government?	How many positions are available in the job fair held by Nanto County Government?
Task04	Can you tell me Nantou County Government located in the left side or right side of Highway?	Can you find out the address of Nantou County Government and write it down.

In the Chinese and English version Nantou web reflecting Taiwanese culture website. The first set of tasks are designed to test the efficiency; when the participants carry out this set of tasks, they experience the cultural preferred attributes including dynamic button, Mouse over (color change), and parallel structure. The second set of tasks is designed to measure the minimal errors; when the participants execute this set of tasks, they interact with the cultural preferences including icon symbols, cute style illustration, photo of landscape banner within local city image, deep hierarchy information structure. The third set of tasks is designed to evaluate the learnability; when the participants carry out this set of tasks, they experience the cultural preferred features, such as popup a new window and images. The fourth set of tasks is designed to measure the comprehension; when the participants execute this set of tasks, they experience the cultural preferred characteristics, such as iconic symbols and cute illustration. In The Chinese and English version Nantou web reflecting the UK culture. The first set of tasks are designed to test the efficiency; when the participants execute this set of tasks, they interact with the cultural preferences including logical layout, search function. The second set of tasks is designed to measure the minimal errors; when the participants execute this set of tasks, they interact with the cultural preferences including images of daily life, banner within color shape. The third set of tasks is designed to evaluate the learnability; when the participants execute this set of tasks, they interact with the cultural preferences including stay in the same window. The fourth set of tasks is designed to measure the comprehension; when the participants execute this set of tasks, they interact with the cultural preferences including no use of flash.

RESULTS

Using One-way ANOVA to compare the performance between Taiwan and the UK cultures within each version of web prototype, the significant differences are shown as below.

Table 4 Performance of two culture participants within each version of web prototype

		Sum of Square	df	Mean Square	F	Sig
prototype reflecting	Within groups	1952.133	1	1952.133	79.064	.000
Taiwanese culture	Between groups	691.333	28	24.690		
efficiency	Total	2643.467	29			
prototype reflecting	Within groups	20.833	1	20.833	16.892	.000
Taiwanese culture	Between groups	34.533	28	1.233		
minimal errors	Total	55.367	29			
prototype reflecting	Within groups	4992.300	1	4992.300	45.438	.000
the UK culture	Between groups	3076.400	28	109.871		
efficiency	Total	8068.700	29			
prototype reflecting	Within groups	43.200	1	43.200	5.492	.026
the UK culture	Between groups	220.267	28	7.867		
minimal errors	Total	263.467	29			
prototype reflecting	Within groups	2323.200	1	2323.200	6.397	.017
the UK culture	Between groups	10168.667	28	363.167		
learnability	Total	12491.867	29			
prototype reflecting	Within groups	4.033	1	4.033	38.500	.000
the UK culture	Between groups	2.933	28	.105		
comprehension	Total	6.967	29			

Within the web prototype reflecting Taiwanese culture, with regard to efficiency, $F(1, 28)=79.064$, $p<0.01$; related to minimal errors, $F(1, 28)=16.892$, $p<0.01$. Within the web prototype reflecting the UK culture, in term of efficiency, $F(1, 28)=45.438$, $p<0.01$; related to minimal errors, $F(1, 28)=5.492$, $p<0.05$; with related to learnability, $F(1, 28)=6.397$, $p<0.05$; in term of comprehension, $F(1, 28)=88.5000$, $p<0.01$. Based on the results of One-Way ANOVA, there is significantly different performance between Taiwan and the UK cultures, particularly, the results of efficiency, minimal errors within the sites which reflect Taiwanese culture, and the results of efficiency, learnability, minimal errors, and comprehension within the sites which reflect the UK culture. Further, the Independent samples t-test is applied to comparing the performance of the participants of the same culture between two version prototypes.

Table 5 Taiwanese's response between web reflecting Taiwanese culture and web reflecting UK culture

Evaluation criteria	The web reflecting Taiwanese culture	The web reflecting UK culture
Efficiency (sec)	27.93	35.80
Learnability (sec)	19.00	30.53
Errors (clicks)	5.00	5.67
Comprehension (correct percentage)	80%	40%
Satisfaction (mean of questionnaire)	3.47	3.07

Table 6 The UK users' response between web reflecting Taiwanese culture and web reflecting UK culture

Evaluation criteria	The web reflecting Taiwanese culture	The Web reflecting UK culture
Efficiency (sec)	14.80	10.00
Learnability (sec)	16.00	12.93
Errors (clicks)	4.60	3.27
Comprehension (correct percentage)	33%	93%
Satisfaction (mean of questionnaire)	3.00	4.00

Based on the results in Table 5, comparing the performance of Taiwanese participants between the web reflecting Taiwanese culture and the web reflecting UK culture, it indicates that Taiwanese participants take a shorter time for executing task01 and task02 and click less in carrying task03, and 80% of Taiwanese users get the correct answers when they interact with the sites which reflect Taiwanese culture. Whilst Taiwanese takes a longer time for carrying out task01 and task02 and clicks more in carrying task 03, and only 40% of Taiwanese users get the correct answers when they interact with the sites which reflect the UK culture. Comparing the mean of Questionnaire for satisfaction, the mean from the prototype reflecting Taiwanese culture is higher than the other one.

According to the results in Table 6, comparing the performance of the UK participants between the web reflecting Taiwanese culture and the web reflecting UK culture, it indicates that the UK participants take very short time for executing task01 and task02 and click less in carrying task03, and 93% of the UK users get the correct answers when they interact with the sites which reflect the UK culture. Whilst the UK users take a longer time for carrying out task01 and task02 and click more in carrying task03, and only 93% of the UK users get the correct answers when they interact with the sites which reflect Taiwanese culture. Comparing the mean of Questionnaire for satisfaction, the mean from the web reflecting the UK culture is higher than the other one.

DISCUSSION AND CONCLUSION

Efficiency. The results of Table 4 indicate that the UK users have a significantly different performance between the websites which reflect Taiwanese culture and the websites which reflect the UK culture. Table 5 and Table 6 shows that Taiwanese users perform better in the sites which reflect Taiwanese culture, compared to the sites which reflect the UK culture. This indicates that Taiwanese users work efficiently when they interact on the sites which reflect Taiwanese culture, and UK sites which reflect the UK culture can not benefit them, whilst the UK users do not work efficiently in the sites which reflect Taiwanese culture because it takes them the longer time to perform the tasks. Based on the data for time performance, it is more effective when the UK users use UK style websites.

Minimal errors. Based on the results of the user testing and from reviewing Table 5, it is found that Taiwanese participants make fewer errors in the websites reflecting Taiwanese culture and more errors in the websites reflecting the UK culture. The UK participants make fewer errors in the websites which reflect the UK culture and more errors in the websites reflecting Taiwanese culture.

Learnability. The results of user testing in Table 5 indicate that Taiwan users have a higher learnability in the sites which reflect the Taiwanese culture, whilst the UK users has the highest learnability in the sites which reflect the UK culture.

Comprehension. With regard to the comprehension, 80% Taiwanese users get the correct answers within the sites which reflect Taiwanese culture, whilst only 46% English users get the correct answers. 33% Taiwanese users get the correct answers within the sites which reflect the UK culture, whilst 93% English users get the correct answers in such sites.

Satisfaction. Based on the results of the questionnaire, the UK participants are more satisfied with the websites which reflect the UK culture (see Table 5), whilst Taiwanese are less satisfied with these. Taiwanese users are more satisfied with the sites which reflect Taiwanese culture (see Table 6).

Overall, the results are consistent with the hypotheses. According to the above findings, it indicates that incorporating cultural dimension and study local cultural preferences should be considered for web developers and designers in order to develop an effective website. The UK culture has individualism, short-term time orientation, lower power distance, and higher masculinity. Overall the UK culturally preferred elements improve the effectiveness for the UK users, such as, images of daily life, banner with color, two column, search function , more mouse over underlined, stay in the same window, and no use of flash. Taiwanese culture has collectivism, long-term time orientation, high context dimension, higher power distance, and lower masculinity. Overall, the Taiwanese culturally preferred elements improve the effectiveness for Taiwanese users, such as, iconic symbols, cute style

illustration, flash animation, moving picture, moving text, popup a new window, dynamic button, mouse over(color change) and three columns. It reveals that if the web is embedded with culturally preferred design elements of the target-culture, it can benefit the users from the target-culture. This research has the potential to help web developers and designers to develop a web interface design that is culturally appropriate.

REFERENCES

Barber, W., and Bardre, A.: (1998), *Culturability: The Merging of Culture and Usability*. In: Proceedings of the 4th Conference on Human Factors and Usability. http://zing.ncsl.nist.gov/hfweb/att4/proceedings/barber

Brinck, T., Gergle, D., and Wood, S. D. (2002), *Designing web sites that work: usability for the web*. Morgan Kaufmann Publishers, San Francisco.

Evers, V. (2002), *"Cultural aspects of user interface understanding: an empirical evaluation of an E-learning Website by international user group"*. Ph.D thesis, Open University.

Hofstede, N. (1999),*" Global Issues, local Concerns"*. Technical COMMUNICATION, Second Quarter 1999, pp. 145-148.

Hofstede, G. (2005) , *Cultures and Organizations: Software of the Mind* . McGraw-Hill, London.

Holland, R., and Young, M. (2009),*" A Theoretical Model for Cross-Cultural Web Design"*, LNCS, Vol.5619, pp. 712-721.

Hsieh, and Hong, S.D.(2013),*" Localization of Web Design: An Investigation of Culturally Preferred Web Attributes in Taiwan and the UK"*, LNCS, Vol.8024, pp. 404-413.

Marcus, A., Gould, E.W. (2000),*" Cultural Dimensions and Global Web User-Interface Design"*. Interactions, pp. 33–46 (July/August)

Nielson, J. (1993), *Usability Engineering*. San Francisco: Academic Press.

Russo, P., Boor, S. (1993), *" How fluent is your interface? Designing for international users. Human Factors and Computer Systems"*. Proceedings of 4th conference on Human factors in computing systems. Addison-Wesley, Boston, pp.342-347.

Sheriden, E. F. (2003), Cross-cultural Web Site Design. Considerations for developing and strategiesfor validating locale appropriate on-line content, *MultiLingual Computing & Technology #43,12* (7). http://www.multilingual.com/FMPro?-db=archives&-format=ad%2fselected%5fresults.html&-lay=cgi&-sortfield=magazine%20number&-sortorder=descend&-op=eq&Ad%20Type=reprint&-max=1817529521&-recid=33326&-token=%5bFMP-currenttoken%5d&-find=

Smart, K. L., Rice, J. C., and Wood, L. E. (2000), *"Meeting the Needs of Users: Toward a Semiotics of the Web Technology & Teamwork"*, IEEE, pp.593-605.

Smith, A., Dunckley, L., French, T., Minocha, S., and Chang, Y. (2004), *"A process model for developing usable cross-cultural websites"*, Interacting with Computers, Vol16, No1, pp.63-91.

Spool, J.M., Scanlon, S., Schroeder, W., Snyder, C., and De Angelo, T. (1999), *Web Site Usability: A Designer's Guide*. Morgan Kaufman Publishers Inc.

Sun, H. (2001),*" 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.

Trompenaars, F. and Hampden-Turner, C. (1997), *Riding the Waves of Culture: Understanding Cultural Diversity in Business*. London: Nicholas Brealey.

Yu, B. and Roh, S. (2002), *" 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, Vol53, No11, pp. 923-933.