Cultural Dimensions and Global Web User-Interface Design: What? So What? Now What?

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Abstract
This paper introduces dimensions of culture, as analyzed by Geert Hofstede in his classic study of cultures in organizations, and considers how they might affect user-interface designs. Examples from the Web illustrate the cultural dimensions.

Introduction

The Web enables global distribution of products and services through Internet Websites, intranets, and extranets. Professional analysts and designers generally agree that well-designed user interfaces improve the performance and appeal of the Web, helping to convert "tourists" or "browsers" to "residents" or "customers." The user-interface development process focuses attention on understanding users and acknowledging demographic diversity. But in a global economy, these differences reflect world-wide cultures. What impact might these cultures have on the understanding and use of Web-based communication, content, and tools? This paper contributes to the study of these complex and challenging issues by analyzing some of the needs, wants, preferences, and expectations of different cultures.

A few simple questions illustrate the depth of the issues.

Consider your favorite Website. How might this Website be understood and used in New York, Paris, London, Beijing, New Delhi, or Tokyo, assuming that adequate verbal translation were accomplished? Might something in its metaphors, mental model, navigation, interaction, or appearance confuse, or even offend and alienate, a user?

Consider what year this is. Is it 2000? In some other counting systems, it is 4698, 5760, or 1420. Even to refer to the counting system of another culture might confuse or alienate people used to their own native system. Let us not forget that Hindu-Arabic numerals, which Western society now takes for granted, were once viewed as the work of the devil by Christian Europe, and educated people for hundreds of years blocked their introduction into European society. Whether imports from other cultures are viewed as delightful gifts or poisonous viruses is often a matter of socio-political context.

Consider the order in which you prefer to find information. If you are planning a trip by train, do you want to see the schedule information first or read about the organization and assess its credibility. Different cultures look for different data to make decisions.

In most projects, Web user-interface and information visualization designers seek to resolve the complex interplay of user, business, marketing, and engineering requirements. Their development process includes iterative steps of planning, research, analysis, design, evaluation, documentation, and training. As they carry out all of these tasks, however, they would do well to consider their own cultural orientation and to understand the preferred structures and processes of other cultures. This attention would help them to achieve more desirable global solutions or to determine to what extent localized, customized designs might be better than international or universal ones.

Cultures, even within some countries, are very different. Sacred colors in the Judeo-Christian West (e.g., red, blue, white, gold) are different than Buddhist saffron yellow or Islamic green. Subdued Finnish designs for background screen patterns (see Figure 1) might, or might not be suitable in Mediterranean climates, in Hollywood, USA, or Bollywood, India. These differences go deeper than just appearance; they reflect strong cultural values. How might these cultural differences be understood?

Many analysts have studied cultures thoroughly and published classic theories; other authors have applied these theories to analyze the impact of culture on business relations and commerce (see Bibliography). Few of these works are well known to the user-interface design community. This paper introduces the work of one theorist, Geert Hofstede, and applies some of his cultural dimensions to Web user interfaces.

Hofstede's Dimensions of Culture

During 1978-83, the Dutch cultural anthropologist Geert Hofstede conducted detailed interviews with hundreds of IBM employees in 53 countries. Through standard statistical analysis of fairly large data sets, he was able to determine patterns of similarities and differences among the replies. From this data analysis, he formulated his theory of five fundamental dimensions of all world cultures (although admittedly hissubjects were constrained to one multinational corporation's world-wide employees, and thus to one company culture.). He also maintained that there is a dominant culture for each country.

In the 1990s, Hofstede published a more accessible version of his research publication in *Cultures and Organizations: Software of the Mind* [Hofstede]. His focus was not on the definition of culture as refinement of the mind (or "highly civilized" attitudes and behavior) but rather on essential patterns of thinking, feeling, and acting that Hofstede asserted were well-established by late childhood. These cultural differences manifest themselves in a culture's choices of symbols, heroes/heroines, rituals, and values.

Hofstede identified five dimensions and rated 53 countries on indices for each dimension, normalized to values (usually) of 0 to 100. His five dimensions of culture are the following:
- Power-distance
- Collectivism vs. individualism
- Femininity vs. masculinity
- Uncertainty avoidance
- Long- vs. short-term orientation

Each of Hofstede's terms appears below with an explanation, implications for user-interface and Web design, and illustrations of characteristic Websites.

Power Distance

Power distance (PD) refers to the extent to which less powerful members expect and accept unequal power distribution within a culture.

High PD countries tend to have centralized political power and exhibit tall hierarchies in organizations with large differences in salary and status. Subordinates may view the "boss" as a benevolent dictator and are expected to do as they are told. Parents teach obedience, and expect respect. Teachers possess wisdom and are automatically esteemed. Inequalities are expected, and may even be desired.

Low PD countries tend to view subordinates and supervisors as closer together and more interchangeable, with flatter hierarchies in organizations and less difference in salaries and status. Parents and children, and teachers and students, may view themselves more as equals (but not necessarily as identical.). Equality is expected and generally desired.

Hofstede notes that these differences are hundreds or even thousands of years old and may not disappear quickly from traditional cultures, even with powerful global telecommunication systems. He also notes that there are interesting indicators of power distance: low PD countries tend to have higher geographic latitude, smaller populations, and/or higher gross domestic product (GDP) per capita than high PD countries.

Based on this definition, power distance may influence the following aspects of user-interface and Web design:
- Access to information: highly (high PD) vs. less-highly (low PD) structured.
- Hierarchies in mental models: tall vs. shallow.
- Emphasis on social and moral order (e.g., nationalism or religion): significant/frequent vs. minor/infrequent use.
- Focus on expertise, authority, experts, official stamps, or logos: strong vs. weak.
- Social prominence: leaders vs. citizens, customers, or employees.
- Important security, restrictions/barriers to access, use of certificates,: explicit, enforced, frequent restrictions on users vs. transparent, integrated, implicit freedom to roam.
- Social roles used to organize information (e.g., a managers' section obvious to all but sealed off from non-managers): frequent vs. infrequent

These PD differences can be illustrated on the Web by examining university Web sites from two countries with very different PD indices (Figures 2 and 3). The Universiti Utara Malaysia (www.uum.edu.my) is located in Malaysia, a country with a PD index rating of 104, the highest in Hofstede's analysis. The Website from the Ichthus Hogeschool (www.ichthus-rdam.nl) and the Technische Universiteit Eindhoven (www.tue.nl) are located in the Netherlands, with a PD index rating of 38.

Note the differences in the two groups of Websites. The Malaysian Website features strong axial symmetry, a focus on the official seal of the university, photographs of faculty or administration leaders conferring degrees, and monumental buildings in which people play a small role. A top-level menu selection provides a detailed explanation of the symbolism of the official seal and information about the leaders of the university.

The Dutch Website features an emphasis on students (not leaders), a stronger use of asymmetric layout, and photos of both genders in illustrations. This Website emphasizes the power of students as consumers and equals.

Individualism vs. Collectivism

Individualism in cultures implies loose ties; everyone is expected to look after one's self or immediate family but no one else. Collectivism implies that people are integrated from birth into strong, cohesive groups that protect them in exchange for unquestioning loyalty.

At work, individualistic cultures value personal time, freedom, challenge, and such extrinsic motivators as material rewards. In family relations, they value honesty/truth, talking things out, using guilt to achieve behavioral goals, and maintaining self-respect. Their societies and governments place individual social-economic interests over the group, maintain strong rights to privacy, nurture strong private opinions (expected from everyone), restrain the power of the state in the economy, emphasize the political power of voters, maintain strong freedom of the press, and profess the ideologies of self-actualization, self-realization, self-government, and freedom.

At work, collectivist cultures value training, physical conditions, skills, and the rewards of work itself. In family relations, they value harmony more than honesty/truth, silence, using shame to achieve behavioral goals, and maintaining face. Their societies and governments place collective social-economic interests over the individual, may invade private life and regulate opinions, favor laws and rights for groups over individuals, dominate the economy, control the press, and profess the ideologies of harmony, consensus, and equality.

Based on this definition, individualism and collectivism may influence the following aspects of user-interface and Web design:
- Personal achievement: maximized (expect the extra-ordinary) for individualist cultures vs. underplayed (in favor of group achievement) for collectivist cultures

- Success: demonstrated through materialism and consumerism vs. achievement of social-political agendas.
- Rhetoric: controversial/argumentative speech and tolerance or encouragement of extreme claims vs. official slogans and subdued hyperbole and controversy
- Imagery: youth and activities vs. aged, experienced, wise leaders and states of being
- Social prominance: individuals emphasized vs products shown by themselves or with groups
- Goals: extrinsic, personal goals emphasized ("you can lose weight so you can look good ") vs. intrinsic or official group goals ("fight overpopulation; have fewer children")
- Morality: emphasis on truth vs. relationships
- Change: emphasis on what is new and unique vs. tradition and history

These ID differences can be illustrated on the Web by examining national park Web sites from two countries with very different IC indices (Figures 4 and 5). The Glacier Bay National Park Website (www.nps.gov/glba/evc.htm) is located in the USA, which has the highest IC index rating (91). The Website from the National Parks of Costa Rica (www.tourism-costarica.com/) is located in a country with an IC index rating of 15. The third image (Figure 6) shows a lower level of the Costa Rican Website.

Note the differences in the two groups of Websites. The USA Website features an emphasis on the visitor, his/her goals, and possible actions in coming to the park.

The Costa Rican Website features an emphasis on nature, downplays the individual tourist, and uses a slogan to emphasize a national agenda. An even more startling difference lies below the What's Cool menu. Instead of a typical Western display of new technology or experience to consume, the screen is filled with a massive political announcement that the Costa Rican government has signed an international agreement against the exploitation of children and adolescents.

Masculinity vs. Femininity
Masculinity and femininity refer to gender roles, not physical characteristics. Hofstede focuses on the traditional assignment to masculine roles of assertiveness, competition, and toughness, and to feminine roles of orientation to home and children, people, and tenderness. He acknowledges that in different cultures different professions are dominated by different genders. (For example, women dominate the medical profession in the Soviet Union, but men dominate in the USA.) But in masculine cultures, the traditional distinctions are strongly maintained, while feminine cultures tend to collapse the distinctions and overlap gender roles (e.g., both men and women can exhibit modesty, tenderness, and a concern with both quality of life and material success.)

The following list shows some typical masculinity (MAS) index values, where a high value implies a strongly masculine culture:

95 Japan
79 Austria
…
62 USA
53 Arab countries
47 Israel
43 France
39 South Korea
05 Sweden

According to Hofstede, traditional masculine work goals include earnings, recognition, advancement, and challenge. Traditional feminine work goals include good relations with supervisors, peers, and subordinates; good living and working conditions; and employment security.

Based on this definition, masculinity and feminity may emphasize different aspects of user-interface and Web design. High-masculinity cultures would focus on the following:
- Traditional gender/family/age distinctions
- Work tasks, roles, and mastery, with quick results for limited tasks
- Navigation oriented to exploration and control
- Games and competition used to gain attention and appeal
- Graphics, sound, and animation used for utilitarian purposes

Feminine cultures would emphasize the following user-interface elements:
- Blurring of gender roles
- Mutual cooperation, exchange, and support, rather than mastery and winning
- Poetry, aesthetics, unifying values used to gain attention and appeal

Examples of MAS differences on the Web can be illustrated by examining Websites from countries with very different MAS indices (Figures 7 and 8). The Woman.Excite Website (woman.excite.co.jp) is located in Japan, which has the highest MAS value (95). The Website narrowly orients its search portal toward a specific gender, which this company does not do in other countries. The ChickClick USA Website (MAS = 52) consciously promotes the autonomy of young women (although it leaves out later stages in a woman's life.) The Excite Website (www.excite.com.se) from Sweden, with the lowest MF value 5, makes no distinction in gender or age.

Uncertainty Avoidance
Uncertain or unknown matters create anxiety in many people, as opposed to the more universal feeling of fear caused by known or understood threats. Cultures vary in their avoidance of uncertainty, creating different rituals and having different values regarding formality, punctuality, legal-religious-social requirements, and tolerance of ambiguity. Hofstede notes the following differences.

Cultures with high uncertainty avoidance (UA) tend to have high rates of suicide, alcoholism, and accidental

deaths, and high numbers of prisoners per capita. Businesses may have more formal rules, require longer career commitments, and focus on tactical operations. These cultures tend to be expressive; people talk with their hands, raise their voices, and show emotions. People seem active, emotional, even aggressive; shun ambiguous situations; and expect structure in organizations, institutions, and relationships to help make events clearly interpretable and predictable. Teachers are expected to be experts who know the answers and may speak in cryptic language. In these cultures, what is different may be viewed as a threat, and what is "dirty" is often equated with what is dangerous.

Low UA cultures tend to have higher caffeine consumption, lower calorie intake, higher heart-disease death rates, and more chronic psychosis per capita. Businesses may be more informal and focus more on strategic matters. These cultures tend to be less expressive and less openly anxious; people behave quietly without showing aggression or strong emotions (though they may consume caffeine to combat depression from the inability to express their feelings.) People seem easy-going, even relaxed. Teachers may not know all the answers (or there may be more than one correct answer), may run more open-ended classes, and are expected to speak in plain language. In these cultures, what is different may be viewed as simply curious, or perhaps ridiculous.

Based on this definition, uncertainty avoidance may influence contrary aspects of user-interface and Web design: High-UA cultures would emphasize the following:
• Simplicity, with limited choices and amounts of information
• Results or implications of actions would be revealed
• Navigation would prevent users from becoming lost
• Mental models and navigation would focus on reducing "user errors"
• Appearance characteristics (color, typography, sound, etc.) would redundantly encode cues to reduce ambiguity.
Low UA cultures would emphasize the reverse:
• Complexity, wandering, and risk, with a stigma on "over-protection" •   Content and choices would be maximized
• Less control of navigation, with links opening new windows and taking people away from the original location.
• Help system might focus on content index as opposed to task-oriented procedures
• Coding of color, typography, and sound would focus on maximizing information (not redundant coding.)

Examples of UA differences can be illustrated on the Web by examining airline Websites from two countries with very different UA indices (Figures 9 and 10). The Sabena Airlines Website (www.sabena.com) is located in Belgium, a country with a UA of 94, the highest of the cultures studied. This Website shows a home page with very simple, clear imagery and limited choices. The British Airways Website (www.britishairways.com) from the

United Kingdom (UA = 35) shows much more complexity of content and choices with popup windows, multiple types of interface controls, and "hidden" content that must be displayed by scrolling.

Long- vs. Short-Term Time Orientation
Work by Michael Bond convinced Hofstede that a fifth dimension seemed to play an important role in Asian countries because of the reliance of these cultures on Confucian philosophyover many thousands of years. Confucian principles can be summarized as follows:
• A stable society requires unequal relations.
• The family is the prototype of all social organizations.
• Virtuous behavior to others means not treating them as one would not like to be treated.
• Virtuous behavior in work means trying to acquire skills and education, working hard, being frugal, being patient, and persevering.

Hofstede and Bond compared only 23 countries for this time orientation dimension. Among those they studied, the following show the most extreme values of the long-term orientation (LT) index:
    118 China (ranked 1)
     80 Japan (4)
     29 USA (17)
      0 Pakistan (23)
Eastern countries are oriented to practice and the search for virtuous behavior while Western countries are oriented to belief and the search for truth.

Based on this definition, high LT countries would emphasize the following aspects of user-interface design:
• Content focused on practice and practical value
• Relationships as a source of information and credibility
• Patience in achieving results and goals
    Low LT countries would emphasize the contrary:
• Content focused on truth and certainty of beliefs
• Rules as a source of information and credibility
• Desire for immediate results and achievement of goals

Examples of LT differences on the Web can be illustrated by examining two versions of the same company's Website for two countries with different LT values (Figures 11 and 12). The Siemens Website (www.siemens.co.de) from Germany (LT=31) shows a typical Western corporate layout that emphasizes crisp, clean functional design aimed at achieving goals quickly. The Chinese version of the corporate Website from Beijing requires more patience in achieving navigational and functional goals.

Conclusions
Hofstede notes that some cultural relativism is necessary: it is difficult to establish absolute criteria for what is noble and what is disgusting. Yet there is no escaping bias; all people develop cultural values based on their early exposure as children. In a multi-cultural world, it is necessary to cooperate to achieve practical goals without requiring everyone to think, act, and believe identically.

This review of cultural dimensions raises many issues about UI design, especially for the Web. We have explored a number of design differences through sample Websites but other, more strategic questions remain:
• How should online teachers/trainers act? Friend/ guru?
• How formal or rewarding should interaction be?
• What motivations should be offered? Money? Fame? Honor? Achievement?
• How full of conflict should content be?
• What role should sincerity, harmony, or honesty play?
• What role exists for personal vs group opinions?
• What role exists for shame vs guilt?
• Would personal Webcams be OK or Not OK?
• What role should community values play in individualist vs collectivist cultures?
• How does the objective of distance learning change in individualist vs. collectivist cultures? Should these sites focus on tradition? Skills? Expertise? Earning power?
• How would job sites differ in individualist vs. collectivist cultures?
• Would honesty and confrontation be suitable strategies for collectivist cultures?
• Should there be different sites for men and women in different cultures?
• How well is advertising hyperbole tolerated?
• How well are ambiguity and uncertainty avoidance received?
• What differences might permeate Western vs Eastern Uis or Websites in regard to truth vs virtue or practice?

In a different perspective, these issues also arise:
• What tools are needed to support multicultural UI design for the Web so that it is feasible to develop multiple versions in a cost-effective manner?
• How can the success of multicultural UIs or Websites be measured so that templates can be developed for appropriate delivery of content.

As the Web continues to develop globally, answering these questions -- and exploring, then exploiting, these dimensions of culture -- will become a necessity and not an option for successful theory and practice.

Acknowledgements

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URLs and Other Resources
The following are a selection of URLs from the list located at http://www.AmandA.com.

ACM/SIGCHI Intercultural listserve: chi-intercultural@acm.org. Moderator: Donald Day, d.day@acm.org.

African-American Websites: bet.com, netnoir.com, blackfamilies.com

Color: colortool.com

Cultural comparisons: culturebank.com

Digital divide: digitaldivide.gov, digitaldivide.org, digitaldividenetwork.org/

Indian culture: indiagov.org/culture/overview.htm

Internationalization resources: world-ready.com/r_intl.htm, world-ready.com/biblio.htm

Internet statistics by language: euromktg.com/globstats/index.html, world-ready.com/biblio.htm

Native-American-oriented Website: hanksville.org/NAresources/

Simplified English: userlab.com/SE.html

Women: wow.com, oxygen.com, chickclick.com
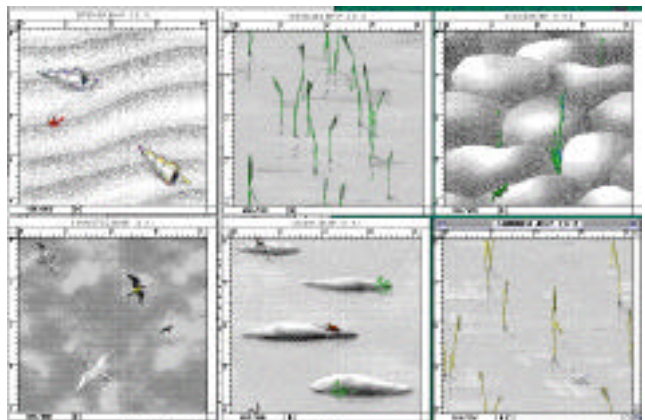
www.HCIBib.org//SIGCHI/Intercultural

Figures

Figure 1. TeamWare Finnish screen patterns.

Figure 2. High power distance: Malaysian Unversity Web site.

Figure 3. Low power distance: Dutch university Websie.

Figure 4. High individualist value: US National Park Website.

Figure 5. Low individualist value: Costa Rican National Park Website.

Figure 6. Costa Rican Website What's Cool contents: Political message about exploitation of children.

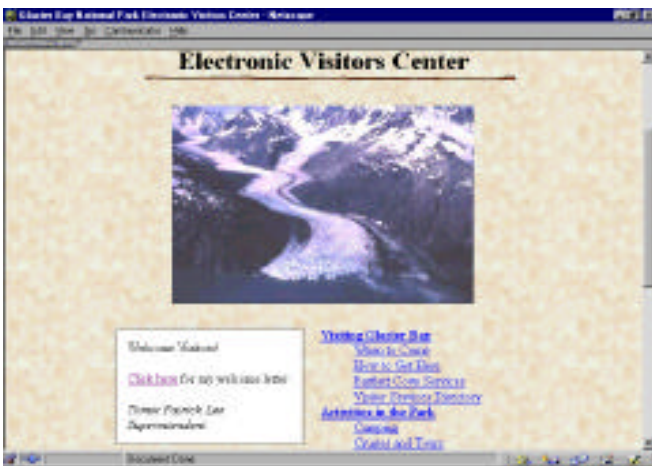Figure 7. High masculinity Website: Excite.com for women in Japan

Figure 8. Medium masculinity Website: ChickClick.com in the USA.
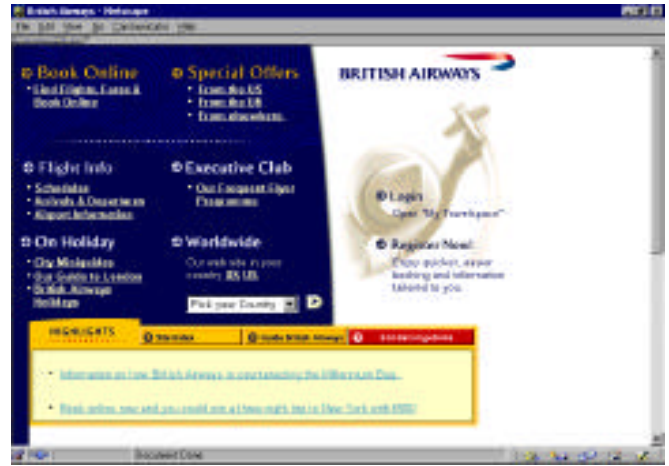

Figure 11. Low uncertainty avoidance: British Airways Website from United Kingdom.

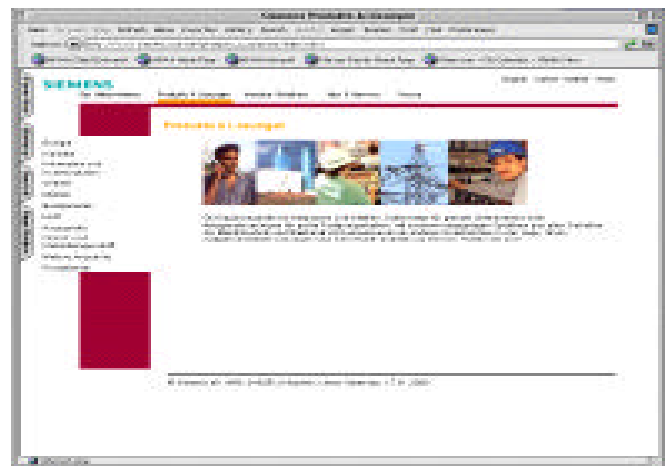Figure 9. Low masculinity Website: Swedish Excite.com.

Figure 12 Low Long-term orientation: Website form Siemens Germany.

Figure 10. High uncertainty avoidance: Sabema Airlines Website from Belgium.

Figure 13: High Long-Term Orientation. Website fromSiemens in China.