Cross-cultural Interface Design Strategy

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ABSTRACT

In this paper we address the emerging need for the integration of cultural and social factors of metaphors, in the context of indigenous users, into interface design by creating cultural models. We review current theoretical and empirical works that use existing cultural models. Finally we proposes a *investigative strategical model* that incorporates all the important components of cultural contexts of metaphors in interface design.

Keywords

Cultural models, Cross-cultural interface design, investigative strategic model.

INTRODUCTION

Due to rapid technology advancement, we now live in a 'small world' with a global marketplace. Foreign ideals and culture are easily spread and adapted by indigenous people in all corners of the globe via radio, television and now especially, computers software and the Internet. Computer software and the Internet were predominately a "North American 'skilled' white male market". It has now become a worldwide commodity and the market has now grown to include all nations, creeds, gender and task use. America is still currently the biggest software exporter in the world with 80% of all software development (O'Sullivan, 2003), but a recent survey has shown that over 60% of American companies are not prepared for a global online marketplace (Sun, 2001). Fernandes (1995) points out that this is due to a lack of understanding of local customers' culture.

In order to gain a market advantage, companies thought it would be enough to just translate language, currency, date and time formats *etc.* However, researchers, like Del Galdo (2001), find this method inadequate.

"The problem with this approach is that it made underlying assumptions about how culture and geography affect how people want to do 'work'. Designers made the assumption that underlying framework or metaphor of the design (i.e., its metaphor,

processes, content, organisation, or navigation model) would have increased the cost of localisation due to the need for additional engineering and user research. Little or no research, particularly in industry, was done to address the more cognitive issues of culture, which meant that there wasn't even a pool of information from which to draw." Del Galdo (2001)

To meet the needs of the diverse market, it is necessary to localise software products and Internet sites for the target market (Del Galdo and Nielsen, 1996; Minocha, French and Dawson, 2003; Sun, 2001; Yeo, 2001). Studies carried out by Russo and Boor (1993) and Zahedi, Van Pelt and Song (2000), into the impact of new technologies, show that users show resistance to and reject products with Western metaphors in favour of products localised according to their cultural customs, idioms *etc.* This has brought on an influx of work into the cultural aspects of interface design but as this paper discusses, the way culture is currently being integrated into interface design is not working. Anthropologists like Hofstede (1991), Trompenaars (1993) and Hannerz (1992) have studied some cultures thoroughly and published classic theories but these works are not used effectively by the user-interface design community (Marcus, 2001). One apparent reason why it has been ineffective is because designers tend to use existing cultural models, which were designed for different purposes *i.e.* business arena and target audience. This has also been noted by Hall (2001).

"The difficulty is that these characterisations are descriptive and not prescriptive, they cannot be used deductively. It would be quite wrong to take the characterisations of Hofstede and others, and from these attempt to deduce how a particular cultural group would respond to particular technology. This is illustrated very sharply by El-Shinnawy and Vinze (1997), who found that they predicted incorrectly the way the use of group support software in North America and Singapore would affect group decision making." Hall (2001)

Since the purposes of these models are different, it is not compatible with all interface design situations. We propose in this paper that one way this problem can be solved, is for the design team to create their own cultural model based on existing ones for the purpose of localising software.

CULTURAL MODELS IN INTERFACE DESIGN AND EVALUATION

The interfaces designed, experiments conducted, and theories created based on existing cultural models do not necessarily work. For discussion purposes, we can divide these existing works into three different categories:

1. Theoretical studies that use existing cultural models.
2. Empirical studies that use existing cultural models.
3. Theoretical works that use existing models combined with other approaches.

We will review these works and provide a model that allows for the investigation of all the important components of cultural contexts to be incorporated into interface design.

Firstly, we will discuss the research carried out by Marcus and Gould (2001) who made a theoretical contribution by using existing anthropological work on culture as guidelines for designing web sites. Secondly, we look at Smith *et al*.'s (2001) and Simon's (2001) work using the same cultural models. They conduct empirical studies, which show that there is a substantial difference in the way the different cultures perceive web designs, which in turn, affects their acceptability. Thirdly, we will discuss work by Zahedi *et al*. (2000) and Sun (2002) who have gone some way in showing that when these cultural models are combined and used in reference with other approaches, they could be used for cross-cultural usability studies. In this paper we call for empirical work on their theories to be conducted to validate their framework. Finally, we will also put forth an *investigative strategic model* that allows for the incorporation of all the important components of cultural contexts of metaphors in interface design.

Theoretical studies that use existing cultural models

Based on the definitions of existing cultural models, Marcus and Gould have tried to create localised interfaces for national cultures. Marcus and Gould (2001) believe that "companies that want to do international business on the web should consider the impact of culture on the understanding and use of Web-based communication, content and tools". They come up with the suggestion of cross-referencing existing works on culture from the likes of Edward T. Hall, David Victor, Fons Trompenaars and Geert Hofstede. They go on to use Hofstede's cultural dimensions as laid out in Cultures and Organisations: Software of the Mind (Hofstede, 1991).

Over a six-year period in the late 1970s, Hofstede interviewed 120 employees of IBM in 53 countries. He identified patterns in the way people act, feel and think and formulated a theory by defining 5 dimensions of culture. These were collectivism vs. individualism, femininity vs. masculinity, long vs. short-term orientation, power distance and uncertainty avoidance. Based on these dimensions, Marcus and Gould outline guidelines for web site design for different countries that fall into the different categories.

Another advocate for designing sites according to Hofstede's dimensions is Sheridan (2001). She defines culture as "how people from certain cultural orientations view and interpret specific images and messages." She follows the pattern used by Marcus and Gould in that she gives guidelines for web site design based on each of the cultural dimensions. However, she does not explain the reasons for using Hofstede, as opposed to other theorists, apart from the fact that Hofstede's work is the most quoted.

The validity of their guidelines is questionable. Firstly, no usability studies were provided from users from the various countries. Secondly, users originating from the same country do not necessarily fit into the cultural mould laid out by Hofstede. The final point that raises doubt about their guidelines is that no other factor of web design has been taken into consideration.

Empirical studies that use existing cultural models

Experimental work has also been conducted using dimensions of existing cultural models as a means of choosing and identifying samples and fitting them into a cultural category. Smith, French, Chang and McNeill (2001) carried out one such study. They use Hofstede's study on generic cultural differences, which included U.K and China to build up on their work. They adapt the Taguchi method – partial factorial experimental design method to explore differences between British and Chinese satisfaction and preferences of websites. They found significant differences between British and Chinese users in their preference of detailed eFinance product information *e.g.* Chinese users tend to adopt a more holistic approach to viewing web content as compared to British users. In describing the set up of their experiment however they use the term 'perception' and 'preference' but do not say if they are equating satisfaction to perception. They did not look at performance issues of usability but concentrated on perception alone. In describing their sample, some detail about the Chinese group was given. They were postgraduate students at Luton University. However no information was given about their British sample. This limits the reliability of the conclusions drawn from their work about the correlation with cultural differences from Hofstede's model.

Simon (2001) also uses Hofstede's dimensions as a means differentiating between the major cultures for the chosen regions of Asia, Europe, Latin/South America and North America. His sample consists of 20 male and 20 female students, from each region, studying for degrees at a business school in the U.S.A. He conducted this study to explore cross-cultural and gender perception and satisfaction levels of different web sites. Perception was defined as "the degree to which they felt the site would be appropriate for their home country" and satisfaction was defined rather vaguely as system success. His results indicate that, "…significant differences occur between the different cultures and gender to warrant the tailoring of sites." We feel that such an impact on culture and gender is an indication that further studies should be done to look at age, social setting, educational background *etc.* against cultural backdrops. Although his results could be used as concrete for the gender aspect, his results are not as rigorous on the cultural front as he uses a 'tarnished' sample. The people he used for the cultural study were slightly differentiated from their local norm as they were now residing in the U.S and can no longer be used as representatives of the majority of indigenous people. Simon does acknowledge literature that disproves of Hofstede's model (Huo and Randall, 1991) but justified using it on empirical research (Sondergaard, 1994) that shows it works in a business setting - from which he took his sample.

In addition to the literature Simon mentions, disapproval of Hofstede's model is also shown by Bourges-Waldegg and Scrivener (1998) who find it too stereotypical and Nocera and Hall (2003) who find it too rigid.

Bourges-Waldegg and Scrivener (1998) presented arguments against localisation[1] in their paper because they found that the use of existing cultural models were inadequate for dealing with this issue as they are generalisations and therefore insensitive to the context in which they are applied. They also believe that existing cultural models tend to "reinforce stereotypical views, such as 'Japanese love the colour white' or 'Germans lack humour'".

Nocera and Hall (2003) find models of culture; especially Hofstede's model remains quite rigid. They say designers who use them are looking for "quick and dirty solutions to be able to deliver systems in the quickest and most cost-efficient way." Another issue they have found raises serious questions about the validity of current usability guidelines for cross-cultural design is the use of the term 'usability engineering' (Nielsen, 1993) which considers computers and humans as equally abstract information processing entities. Sun (2002), whose work is discussed

later on in this paper, also takes aversion to this term and suggests a more humanist approach be taken for usability studies.

Theoretical works that use existing models combined with other approaches

Some researchers have seen the limitations to using existing cultural models alone and have incorporated them with other approaches to develop conceptual theories and frameworks. An example of this is Zahedi *et al.* who developed a conceptual framework for international web design. Zahedi *et al.* developed their framework by synthesising social constructionist theory, Hofstede's categorization of differences in human mental programming and Hall's structure of time. They concluded that the effectiveness of web communication is influenced by two sets of factors: cultural factors and individual characteristics.

The main use of their theory is to analyse the impact of cultural and individual factors on the effectiveness of various web designs. They state that the perceived effectiveness of the web document impacts the reader's overall satisfaction with the content of that web document. Zahedi *et al.* claim their conceptual theory is for web design but all of their propositions and examples of them concentrate on text alone. This is only one part of several in web interface design and therefore casts a shadow over their 'abstract' claims. Seeing as there is no empirical work to back their claims, it is difficult to conclude if their theory will indeed work for the effectiveness of web documents let alone for other component of websites such as interface and content. Another point of contention with their framework is that they consider satisfaction to be the main issue in interface design and usability to be a sub-component of it. Some researchers and designers on the other hand believe that usability should be the overriding factor.

Sun (2002) considers usability from a humanist approach, which includes context and culture and gives more leverage to users. He incorporates Zahedi *et al.*'s model (2000) with other works and provides a tentative model for cultural usability. His model combines dynamic processes and changing variables from existing cultural models. Sun uses the ecology metaphor for technology, which includes local differences, while still capturing the strong interrelationships among the social, economic and political contexts in which technology is invented and used. There is as yet no empirical work to support Sun's model but given the literature supporting his theory, we believe that some experimentation needs to be undertaken to validate it.

People who share Sun's perspective on the importance of local differences and social contexts are Bourges-

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[1] Their paper is against localisation for heterogeneous systems such as CSCWs but this paper is advocating localisation for homogenous systems for indigenous users.

Waldegg and Scrivener (1998). They found that usability problems were a result of the way the meanings of representations were rooted in culturally specific contexts. They also advocate the use of the circuit of culture that Sun incorporated into his model as they claim that existing works tend to focus on target cultures but "cultures are not ontologically objective and they are continuously interacting and developing."

SUMMARY

The Internet, which comprises of the World Wide Web, has such a diverse user spectrum that it is vital for designers to get the design of their interface right or they risk loosing and alienating audiences and customers based on cultural and social biases. One way to go about this is to have a global site for easy accessibility for all the customers[2] and have a localised site that caters to cultural preferences. Designers ought to be careful though to not stereotype their markets by using existing cultural models. In this time of 'political correctness', the designer or company image could be portrayed as ignorant. We feel that they should create their own as originally suggested by Del Galdo and Nielsen (1996). Hall (2001) who said, "Perhaps we should set aside Hofstede and other simple descriptive frameworks and engage with the cultures directly" also emphasises this.

Rather than relying on samples which have similar cultural background information, we suggest researchers and designers should engage with the cultures directly, in-order to get a better understanding of the indigenous people.

Another point of issue raised in this paper, is the use of some terms in this discipline. Terms such as usability, perception, satisfaction, accessibility *etc.* are used interchangeably as seen in the papers discussed. This leaves them open to being interpreted differently by designers using the literature. This calls for a standardisation of terms so that the available body of knowledge can be systemised (Hall, 2001) which will in turn make it less time consuming and cheaper for designers to have access to cross cultural usability information.

CROSS-CULTURAL INTERFACE DESIGN STRATEGY

We propose a strategy for steps to be taken when designing interfaces for cross-cultural use. Due to technology advancement foreign ideals and culture are easily spread and adapted by indigenous people in all corners of the globe but we need to recognise the fact that not all people who use the Internet are 'bi' or 'multi'

cultural. This model will also cater for indigenous people who have not been exposed to foreign cultures or are not well travelled or are just not familiar with other cultures.

This model traverses heuristics like usability, national formats like language translation, date, and time and certain cultural attributes like colour. It looks into the doctrine behind the concept of metaphors. *e.g.*

- libraries to digital libraries – information categorisation, knowledge transfer *etc.*
- banks to online banks – trust *etc.*
- shopping to eCommerce – all of above stated concepts including price negotiation, product classification *etc.*

The model falls into the design phase of the project lifecycle *i.e.* after the market demographics *etc.* has been identified. It can be used for most interface design, from digital libraries to online banks. As an example and to clarify the model we will use the shopping metaphor for eCommerce interface design.

We will go through each of the stages and suggest a fitting methodology to go about completing that phase before moving on to the next one.

Investigation

Phase 1 – Identify how people from the different cultures in the various countries shop by doing an ethno-methodologically informed ethnographic study (Gunter and Randall, 2003) of the indigenous samples. This will allow the researcher to adopt a different cultural perspective, learn to understand the thought processes of another culture and to see it from the native's viewpoint.

Using the 'participant observation' approach of an ethno-methodically informed ethnographic study, the shopping behaviour of the different cultures should be observed to reveal ordinary and practical activities of actual 'real-life' shopping. Shoppers should also be asked to fill in questionnaires. This approach brings into consideration the context in which these behaviours take place (Gunter and Randall, 2003).
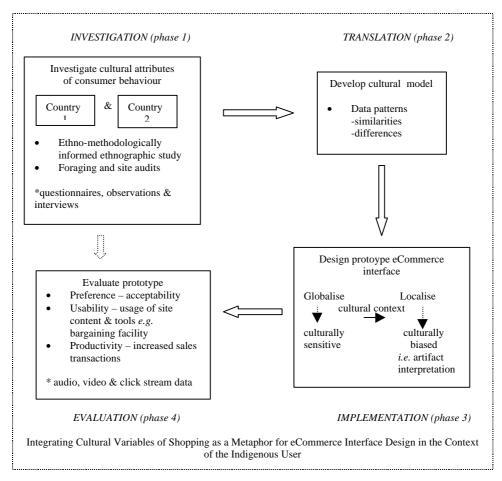
Phase 1i - Identify social and cultural factors including cultural markers and attractors to localise the interface on a cultural level and also to avoid developing a culturally offensive global site.

For cultural markers, do a foraging study (Badre, 2001) by categorising eCommerce sites according to country, language, visuals, colours, page layout *etc.* This will reveal culture specifics of the design elements when they are compared and contrasted to identify the patterns. For cultural attractors, interview

[2] Nielsen (2000, p319) found that due to the dominance of web sites by the Americans, many users view ".com" as the standard ending of web sites. We posit that having a global site will therefore increase accessibility as users who are not familiar with local domain endings like ".co.uk" will be made aware of it from the global site and have the option of using the localised site as well.

cultural/usability experts of the target culture or those that have a good understanding of that culture. This is to identify cultural signs and their meanings to that culture. For example, colours, banner adverts, trust signs, metaphors, language cues *etc.* Then conduct audits of sites that are typical exemplars to identify elements of the interface that reflect the signs and their meanings, which match the expectations of the local culture (Minocha *et al.*, 2003).

Translation
Phase 2 – Create a cultural model, which is contingent on the international variables ascertained above. This is to identify and illuminate similarities and differences in the observed characteristics of the indigenous samples' particular practices and systems of shopping (Hantrais, 1996) and assess the degree of localisation necessary for the eCommerce site.

INVESTIGATION (phase 1) *TRANSLATION (phase 2)*

Investigate cultural attributes of consumer behaviour

| Country 1 | & | Country 2 |

- Ethno-methodologically informed ethnographic study
- Foraging and site audits

*questionnaires, observations & interviews

Develop cultural model

- Data patterns
  -similarities
  -differences

Evaluate prototype
- Preference – acceptability
- Usability – usage of site content & tools *e.g.* bargaining facility
- Productivity – increased sales transactions

* audio, video & click stream data

Design protoype eCommerce interface

Globalise   Localise
          cultural context

culturally   culturally
sensitive   biased
          i.e. artifact
          interpretation

EVALUATION (phase 4)   *IMPLEMENTATION (phase 3)*

Integrating Cultural Variables of Shopping as a Metaphor for eCommerce Interface Design in the Context of the Indigenous User

Phase 1ii – Assess the different indigenous user attitudes towards eCommerce sites available on the market today to find out performance, preference and acceptance levels and what affects these levels. By conducting these studies at this stage, cultural reactions and variances would have been identified to allow for changes to be made in Phase 3I when conducting usability evaluations on the prototype.

Gather users' opinions and experiences following the 'think-aloud' protocol whilst they complete tasks on real sites based on a global design, native design and foreign design (which would have been identified in the previous objective).

The above objectives will produce the international variables needed to create a cultural model (Del Galdo and Nielsen, 1996). Then compare and contrast the findings, similarities and differences amongst the sample thus creating a customer profile.

Implementaion
Phase 3 – Utilising the results from the ethnographic study and cultural model design a 'socio-culturally'-localisable eCommerce site with a culturally sensitive generic site. It should be made adaptable with the option of the various countries. The selection should then bring up from the information bank, a localised site designed with the appropriate cultural and social factors in place including national level formats such as language, time and currency.

Phase 3i – Implement the prototype and perform usability tests using indigenous population of target markets.

Evaluate prototype using task analysis procedures, usability questionnaires, think aloud protocol and observational studies. Internet technology, like the Netusability software could be used. This records video and audio data of the user and also click stream data. This produces an in-depth examination of the user experience of the website and the visual data from the tests will show the difficulties experienced by the user (Lister, 2001).

Evaluation
Phase 4 – Based on results of usability test, analyse data to make amendments to and implement working site. To get a working site an iterative process should be followed. Make changes to the prototype based on the results from the evaluation. Implement the prototype and conduct further evaluations on the working site.[3]

CONCLUSION
The importance of studying culture is shown over and over again in several studies in all areas of technology design. Knowledge of the various targeted markets is vital for the correct catering of metaphors, artefact representation, biases and so on (Evers, 1999; Fernandes, 1995; Honold, 2000). Use of the proposed model will provide a comprehensive insight into socio-cultural factors of the target market that affect the interface design. It will also provide information about the methods to be used in the area of cross-cultural usability evaluation. The model can also be used across the broad range of interface design for a global market, which could be adapted by eEnterprise sites, digital libraries, online banks, travel agents, kiosks and much more.

The model will abet in bridging the divide between cultural theorists, sociologists and computer interface architects due to the process actually being pragmatic in the commercial domain. In cross-cultural studies it is imperative that the individual cultures be studied to build up rich repositories which, will in turn make it less expensive and time consuming for designers, companies and researchers to gather information about different cultures around the world.

REFERENCES

Bourges-Waldegg, P. & Scrivener, A. R. (1998). Meaning; the Central Issue in Cross-Cultural HCI Design. *Interacting with Computers Special Issue*. 9, (3), p. 287-309.

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[3] The evaluation methods used is still a point of contention as some literature advices the use of the same methods across cultures but more recent material is available where suggestions are made for the use of different methods for the different cultures.

Del Galdo, E. (2001). Internationalisation then and now. Designing for global markets. Conference (6th. 2001). *Proceedings of the third international workshop on internationalisation of products and systems*. Edited by D. Day & L. Duckley. Buckinghamshire: The Open University. p.15-18.

Del Galdo, E. & Nielsen, J. (1996). *International User Interfaces*. New York: Wiley Publishing.

Fernandes, T. (1995). 'Global interface design'. Human Factors and Computer Systems. Conference (5th. 1995). *Conference companion on Human factors in computing systems*. Edited by I. Katz *et al*. New York: ACM Press. p.363-364.

Gunter, K. & Randall D. (2003). "Is it cheaper online?" Cultural motivations for Internet shopping'. Culture and HCI: Bridging the Cultural and Digital Divides. Conference (6th: 2003). *Proceedings of the 2nd British Computer Society Human Computer Interaction Workshop*. Edited by K. Gunter *et al*. London: University of Greenwich. p.57-71.

Hall, P. (2001). 'The cross-cultural web'. Designing for global markets. Conference (6th. 2001). *Proceedings of the third international workshop on internationalisation of products and systems*. Edited by D. Day & L. Duckley. Buckinghamshire: The Open University. p.109-113.

Hannerz, U. (1992). *Cultural complexity; Studies in the social organisation of meaning*. New York: Columbia University Press.

Hofstede, G. (1991). *Cultures and organisations: Software of the mind.* New York: McGraw-Hill.

Marcus, A. & Gould, E. W. (2000). Cultural dimensions and global web user-interface design: What? So What? Now What? [Online]. Available from:http://www.amanda.com/resources/hfweb2000/AMA_CultDim.pdf. [Accessed 23 April 2003].

Marx, A.N. (1994). 'Using metaphor effectively in user interface design'. Human Factors and Computer Systems. Conference (4th. 1994). *Conference companion on Human factors in computing systems*. New York: ACM Press. p.379-380.

Nielsen, J. (2000). *Designing web usability*. U.S.A: New Riders Publishing

Nocera, J.A & Hall, P. (2003). 'Making sense in intercultural software implementation'. Culture and HCI: Bridging the Cultural and Digital Divides.

Conference (6th: 2003). *Proceedings of the 2nd British Computer Society Human Computer Interaction Workshop*. Edited by K. Gunter *et al*. London: University of Greenwich. p.72-79

O'Sullivan, P. (2003). 'Building Cultural Diversity into the Development of Multilingual Applications'. *The LISA Newsletter: Globalization Insider XI/2.4*. Ireland: IBM/Lotus Software Group

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

Sheridan, E.F. (2001). Cross-cultural web site design: Considerations for developing and strategies for validating locale appropriate on-line content. [Online]. MultiLingual Computing, Inc. Available from: http://www.multilingual.com [Accessed 23 April 2003].

Simon, S. J. (2001). 'The impact of culture and gender on web sites: An empirical study'. *ACM SIGMIS Database*. New York: ACM. 32, (1). p.18-37

Smith, A., French, T., Chang, Y. & McNeill, M. (2001). 'eCulture: A comparative study of eFinance web site usability for Chinese and British users'. Designing for global markets. Conference (6th. 2001). *Proceedings of the third international workshop on internationalisation of products and systems*. Edited by D. Day & L. Duckley. Buckinghamshire: The Open University. p.87-100.

Sun, H. (2001). 'Building a culturally-competent corporate web site: An exploratory study of cultural markers in multilingual web design'. ACM Special Interest Group for Design of Communications. Conference (10th. 2001). *Proceedings of the 19th annual international conference on Computer documentation*. New York: ACM Press. p.95-102

Trompenaars, F. (1993). *Riding the waves of culture: understanding cultural diversity in business*. London: Nicholas Brealey.

Yeo, A.W. (2001). 'Global-software development lifecycle: An exploratory study'. Human Factors and Computer Systems. Conference (4th. 2001). *Proceedings of the SIGCHI conference on Human factors in computing systems*. New York: ACM Press. p.104-111.

Zahedi, F., Van Pelt, W. and Song, J. (2001). 'A conceptual framework for international web design'. *IEEE Transactions on Professional Communication*. 44, (2), p.83-103.